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# OBSERVABLE PERSUADERS

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A LONGITUDINAL STUDY ON THE EFFECTS OF QUALITY SIGNALS  
IN THE CONTEMPORARY VISUAL ART MARKET

Monika Kackovic

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# OBSERVABLE PERSUADERS

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**A Longitudinal Study on the Effects of Quality Signals  
in the Contemporary Visual Art Market**

OBSERVABLE PERSUADERS:

**A Longitudinal Study on the Effects of Quality Signals  
in the Contemporary Visual Art Market**

**ACADEMISCH PROEFSCHRIFT**

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# TABLE OF CONTENTS

<b>CHAPTER 1</b>	<b>11</b>
<b>INTRODUCTION</b>	
<b>1.1 MAIN THEORETICAL THEMES</b>	<b>15</b>
1.1.1 Multi-dimensional qualitative attributes of sources conveying signals	16
1.1.2 Signals of the same kind and sets of signals of different kinds	18
1.1.3 Effect of signals on different kinds of buyers and different kinds of intermediaries	18
1.1.4 Effect of signals and sets of signals on different phases of producers' career trajectories	20
<b>1.2 EMPIRICAL SETTING</b>	<b>21</b>
1.2.1 Contemporary visual art market	21
1.2.2 Multiple sources of data	21
1.2.3 Summary of data	22
<b>1.3 EMPIRICAL STRATEGY</b>	<b>23</b>
<b>1.4 STRUCTURE OF THE THESIS</b>	<b>24</b>
<b>CHAPTER 2</b>	<b>27</b>
<b>PICKING THE CREAM OF THE CROP:</b>	
A Study on the Effectiveness of Jury Selection to a Prestigious Art Academy	
<b>2.1 INTRODUCTION</b>	<b>29</b>
<b>2.2 THEORETICAL FRAMEWORK</b>	<b>30</b>
<b>2.3 EMPIRICAL SETTING</b>	<b>32</b>
2.3.1 Evolution of the selection process	32
2.3.2 Selection rounds	33
<b>2.4 DATA</b>	<b>34</b>
2.4.1 Data collection	34
2.4.2 Interviews and non-participatory observation	35
2.4.3 Analysis of interview notes	35
2.4.4 Performance measures	38
<b>2.5 AT FIRST GLANCE: THE ADMITTED AND THE REJECTED</b>	<b>38</b>
2.5.1 Summary statistics	38
2.5.2 Preliminary Analyses	40
<b>2.6 SELECTION AND FUTURE PERFORMANCE</b>	<b>45</b>
2.6.1 Interview notes and selectivity	45
2.6.2 Multiple selection criteria	47
2.6.3 Switching regressions	50
<b>2.7 ROBUSTNESS TESTS</b>	<b>56</b>
2.7.1 Alternative selection simulations	56
<b>2.8 CONCLUSIONS</b>	<b>59</b>
<b>2.9 APPENDIX</b>	<b>61</b>

<b>CHAPTER 3</b>	<b>69</b>
<b>LOOKING FORWARD TO THE PAST:</b>	
The Effects of Past Sales and Signals on Expert Buyers	
<b>3.1 INTRODUCTION</b>	<b>71</b>
<b>3.2 THEORETICAL FRAMEWORK AND HYPOTHESES</b>	<b>73</b>
3.2.1 Signals and pre-purchase uncertainty	73
3.2.2 Expert buyers and number of signals	75
3.2.3 Expert buyers and source credibility of third party sources	76
3.2.4 Number of signals and the moderating role of source credibility	77
3.2.5 Expert buyers and past sales	78
<b>3.3 EMPIRICAL SETTING</b>	<b>79</b>
3.3.1 Primary market for contemporary visual art	79
3.3.2 Prestigious art residency	80
3.3.3 Corporate art collectors	81
<b>3.4 EMPIRICAL STRATEGY</b>	<b>81</b>
3.4.1 Model	81
3.4.2 Variables	82
3.4.2.1 Sales	82
3.4.2.2 Past performance and signals	83
3.4.2.3 Measuring credibility of third party sources	84
3.4.2.4 Control variables	84
3.4.3 Estimation	85
3.4.4 Summary statistics	85
<b>3.5 RESULTS</b>	<b>87</b>
3.5.1 Explaining sales and sales price by signal counts	87
3.5.2 Explaining sales and sales price by source credibility	89
3.5.3 Explaining sales and sales price by signal counts moderated by source credibility	90
3.5.4 Explaining sales and sales price by past sales	93
<b>3.6 DISCUSSION AND CONCLUSION</b>	<b>94</b>
3.6.1 Summary of contributions	94
3.6.2 Managerial relevance	96
3.6.3 Limitations and future research	97
<b>3.7 APPENDIX</b>	<b>99</b>

<b>CHAPTER 4</b>	<b>101</b>
<b>CROSSING THE THRESHOLD AND EXITING NASCENCY:</b>	
Antecedents to gaining full-fledged legitimacy	
<b>4.1 INTRODUCTION</b>	<b>103</b>
<b>4.2 THEORETICAL FRAMEWORK AND HYPOTHESES</b>	<b>105</b>
4.2.1 The end of nascency and the role of the core mediator	105
4.2.2 Third party signals	106
4.2.3 Source credibility of third party sources	107
4.2.4 Diversity of sources	108
<b>4.3 EMPIRICAL SETTING</b>	<b>109</b>
4.3.1 Art galleries and the primary art market	109
4.3.2 Renowned art academy	110
4.3.3 Data collection and sample	110
<b>4.4 EMPIRICAL STRATEGY</b>	<b>110</b>
4.4.1 Model	110
4.4.2 Variables	111
4.4.2.1 Affiliation with art gallery	111
4.4.2.2 Source credibility and source diversity	111
4.4.2.3 Measuring credibility of third party sources	113
4.4.2.4 Control variables	113
<b>4.5 RESULTS</b>	<b>114</b>
<b>4.6 ADDITIONAL ANALYSES</b>	<b>117</b>
<b>4.7 DISCUSSION AND CONCLUSION</b>	<b>118</b>
<b>4.8 APPENDIX</b>	<b>121</b>

<b>CHAPTER 5</b>	<b>123</b>
<b>SEQUENCES AND CONSEQUENCE:</b>	
The effects of the first sequence of signals from highly credible third party sources on long-term sales performance	
<b>5.1 INTRODUCTION</b>	<b>125</b>
<b>5.2 THEORETICAL FRAMEWORK</b>	<b>126</b>
5.2.1 Overcoming the liability of newness by external legitimation	126
5.2.2 Signals from highly credible third party sources	127
5.2.3 Sequences of signals	128
<b>5.3 EMPIRICAL SETTING</b>	<b>128</b>
5.3.1 Contemporary visual art market	128
5.3.2 Sales to different categories of customers	129
<b>5.4 EMPIRICAL STRATEGY</b>	<b>130</b>
5.4.1 Model	130
5.4.2 Variables	130
5.4.2.1 Sales	131
5.4.2.2 First sequence of signals	131
5.4.2.3 Measuring credibility of third party sources	133
5.4.2.4 Control variables	133
<b>5.5 RESULTS</b>	<b>134</b>
5.5.1 Summary statistics	134
5.5.2 Explaining late sales by first sequence of signals	135
<b>5.6 ADDITIONAL ANALYSES</b>	<b>137</b>
<b>5.7 DISCUSSION AND CONCLUSION</b>	<b>139</b>
5.7.1 Summary of contributions	139
5.7.2 Limitations and future research	141
<b>5.8 APPENDIX</b>	<b>142</b>
<b>CHAPTER 6</b>	<b>143</b>
<b>DISCUSSION AND CONCLUSION</b>	
<b>BIBLIOGRAPHY</b>	<b>151</b>
<b>SUMMARY</b>	<b>164</b>
<b>ACKNOWLEDGMENTS</b>	<b>168</b>
<b>ABOUT THE AUTHOR</b>	<b>171</b>

## LIST OF FIGURES AND TABLES

### LIST OF FIGURES

FIGURE 2.1	Box plot distributions of ArtFacts.Net rankings	40
FIGURE 2.2	Histograms of ArtFacts.Net rankings	41
FIGURE 2.3	Two-way scatter plots of ArtFacts.Net rankings	42
FIGURE 2.4.1	Distribution of number of artworks sold for accepted and rejected applicants	42
FIGURE 2.4.2	Distribution of number of artworks sold (log) for accepted and rejected applicants	43
FIGURE 2.4.3	Distribution of sales price of artworks sold (log) for accepted and rejected applicants	43
FIGURE 2.5	Scores on jury criteria for accepted and rejected applicants	55
FIGURE 2.6	Performance outcomes (log) for the observation sample and simulations	58
FIGURE 3.1	Descriptive statistics: The effects of signals in t-1 on sales in t	86
FIGURE 3.2	Estimating sales count: A counter-factual experiment	91
FIGURE 3.3	Estimating sales price: A counter-factual experiment	92

### LIST OF TABLES

TABLE 2.1	Description of selection criteria	37
TABLE 2.2	Sample characteristics, all applicants with and without jury notes	39
TABLE 2.3	Residuals and probability of acceptance	44
TABLE 2.4	Probability of interview notes related to performance	46
TABLE 2.5	Probability of acceptance	48
TABLE 2.6.1	Explaining reputational rankings by selection criteria	51
TABLE 2.6.2	Explaining sales at art auctions by selection criteria	52
TABLE 3.1	Explaining sales count by lagged signal counts	87
TABLE 3.2	Explaining average sales by lagged sales price	88
TABLE 3.3.1	Explaining sales count by lagged sales credibility	89
TABLE 3.3.2	Explaining sales price by lagged sales credibility	89
TABLE 3.4	Explaining sales count by signal count and source credibility level: A counter-factual experiment	91
TABLE 3.5	Explaining sales price by signal count and source credibility level: A counter-factual experiment	92
TABLE 4.1	Cox proportional hazard estimate of the first affiliation with an art gallery	116
TABLE 5.1	Explaining late sales (log) by first sequence of signals	136
TABLE 5.2	Explaining late sales (log) by first sequence of signals with high credibility restriction	138
TABLE 5.3	Explaining late sales (log) by first sequence of signals with time restriction	138

# CHAPTER 1

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## INTRODUCTION

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Some years ago, a cartoon made by Gumbah, a Dutch illustrator, was printed in *de Volkskrant*, a national newspaper in the Netherlands. The cartoon portrayed a middle-aged couple contemplating what appeared to be a contemporary work of art. The punch line in the text bubble from the woman read: “*I find this awfully beautiful, if I am not mistaken*”<sup>1</sup>. In this cartoon, contemporary art is cleverly depicted as being surrounded by extreme uncertainty, presumably because of incomplete and imperfect information about the producer’s underlying quality, which is difficult to observe directly.

Uncertainty about quality is not unique to contemporary visual arts. In many markets, e.g., high tech industries, financial markets, professional services, and other creative industries, quality is often difficult to observe *a priori* (Nelson, 1970; 1974). If the cartoonist had decided to satirize other markets besides contemporary art, he could have illustrated a cartoon depicting two stockbrokers staring at their computers, with one saying to the other: “*I guess this could be an awfully good investment, if I am not mistaken*”. Or a young couple at a used car lot, looking thoughtfully at a car, and one saying to the other: “*I think this car is awfully dependable, if I am not mistaken*”. Imperfectly detectable quality among competing producers coupled with imperfect and incomplete quality information about the products on sale often results in high degrees of uncertainty among buyers and intermediaries, which may negatively impact sales and in extreme cases even lead to market failure (Akerlof, 1970; Spence, 1973).

Most markets have some degree of asymmetrically distributed information, in which different people know different things about the quality of the products in particular transactions (Stiglitz, 2002), and such information, or lack thereof, may substantively influence purchase decisions (Akerlof, 1970; Spence, 1973). A distinction in kinds of asymmetries of information can be made and broadly understood in terms of information imperfections about quality and information imperfections about intent (Stiglitz, 2000). The former focuses on how signals, which convey publically observable quality information, affect buyer behavior (Spence, 1973), while the latter concentrates on how private information and hidden actions may cause problems associated with moral hazards<sup>2</sup> (Hölmstrom, 1979; Arrow, 1970) or adverse selection<sup>3,4</sup> (Akerlof, 1970).

The core focus of this thesis is on the former; namely, to examine the extent to which signals and the sources transmitting those signals function as observable persuaders and reduce uncertainty caused by information imperfections about producers’ underlying quality, mainly in the empirical context of the primary art market<sup>5</sup>.

---

1. *Ik vind dit verschrikkelijk mooi, als ik me niet vergis.*

2. A moral hazard is when “privately taken actions affect the probability distribution of an outcome” (Hölmstrom, 1979: 74).

3. Adverse selection is when “there is an incentive for sellers to market poor quality merchandise, since the returns for good quality accrue mainly to the entire group instead of the individual seller.” (Akerlof, 1970: 489).

4. In a general way, moral hazards are also described in the sketch with the stockbrokers, especially if the trade was based on a hidden action, e.g., a kick-back, which may have a positive financial effect for the stockbrokers but negatively affect investors; and adverse selection is described in the other sketch where the couple are worried about hidden information the salesman may have about whether the car is a lemon.

5 The contemporary art market consists of the primary market, where artworks are sold for the first time either directly by the artist or through intermediaries such as an art gallery, and the secondary and tertiary art markets, where artworks are re-sold through intermediaries and art auction houses, respectively (Singer and Lynch, 1994).

This market has an oversupply of producers in part due to relatively low barriers to entry, uncertain demand, and no objective criteria for evaluating the quality of the products made and sold (Caves, 2000; DiMaggio, 1987; Yogev, 2010; Velthuis, 2013). Coupled with the fact that producers' underlying quality is largely unknown to all parties involved in a transaction, there is extreme uncertainty in this market, which may further negatively affect the already uncertain demand (Prinz, Piening, and Ehrman, 2015).

One way to overcome these problems is by interpreting signals, which facilitate the construction of quality through commensuration (Espeland and Stevens, 1998) and relative comparisons among competitors (Spence, 1973, 1974; 2002; Bergh, Connelly, Ketchen and Shannon, 2014). Signals are publically observable events or actions that convey information about producers' unobservable or latent quality (Spence, 1973, 1974, 2002). The cartoon with the middle aged couple pondering the painting illustrates how difficult the construction of quality is without signals, as signals provide input for structuring mechanisms, e.g., rankings or other segmentation devices, and help inform buyers and decision-makers about what is considered "good" and what not in a particular market (Anand and Watson, 2004). Describing different kinds of signals transmitted by different kinds of sources that aid commensuration and comparison among producers can be easily done by adding the following subtext to this cartoon: *"It really is quite simple, darling. Remember, we saw this artwork last year at Art Basel, that prestigious art fair in Switzerland. And I just read raving reviews in The Art Newspaper and The New York Times about this artist's solo exhibition at MoMa. Do you remember that this artist won the Turner Prize not long after graduating from that elite art school and exhibiting in the Arsenale at the Venice Biennale? Not surprising that Gagosian Gallery just sold more artworks, including this one, to Deutsche Bank, which already owns so many of this artist's paintings."*

It is reasonable to assume that not all signals are equally persuasive or, in other words, it is highly probable that some signals from some sources will have a disproportionately greater influence on producers' performance outcomes than others. The description of the signals in the cartoon above provides a clear-cut example of many different kinds of signals, concerning a single producer, all of which are transmitted by highly credible sources. However, most producers active in this market are usually the subjects of considerably fewer signals that originate from considerably less credible sources.

The main objective of this thesis is to gain a better understanding of the differential effects different kinds of signals transmitted by different kinds of sources with different levels of credibility have on producers' performance outcomes, e.g., sales price paid, number of sales, reputational rankings and selection by different kinds of intermediaries. To gain a fine-grained understanding of these effects, a multi-dimensional approach is taken in analyzing the quantitative characteristics of signals and qualitative attributes of sources conveying those signals, and examining these effects on not only different categories of buyers and intermediaries but also in the context of the particular career phase of the producers. The insights gained in this thesis are helpful in understanding inequalities in the distribution of success in a market where quality differentials among competing producers are imperfectly observable and information about their underlying quality is imperfect and/or incomplete. Special attention is paid to initial advantages producers may gain from signals received at the start of their career, as well as in

subsequent career phases, in which seemingly inconsequential rewards or benefits gained by being the subject of signals may grant these producers access to opportunities not given to their competitors. Such preferential treatment could lead to superior performance that could start self-reinforcing feedback mechanisms, which could result in persistent performance for some producers, further increasing inequalities in the distribution of success in the focal market (Merton, 1968; Azoulay, Stuart and Wang, 2013).

Signaling theory (Spence, 1973) describes how signals create a separating equilibrium that helps differentiate between high and low quality producers based on an inverse cost quality relationship, in which receiving or transmitting signals is less costly and easier for higher quality producers than those of lower quality (Spence, 1973, 1974; 2002; Bergh et al., 2014; Connelly, Certo, Ireland, and Reutzel, 2011). An example of a separating equilibrium is provided in the cartoon with the couple looking at the painting, after the hypothetical subtext describing the signals of quality has been added. Namely, the perceived high quality of this producer as constructed by these signals becomes evident because it would be too difficult for low quality producers to receive such signals. Another way to 'separate' between high and low quality producers is to consider the costs incurred by the sources transmitting the signals (Bergh et al. 2014). Referring back to the cartoon, a prestigious art education is an example of a signal that is conveyed by the producer (Spence, 1973), while the other signals are transmitted by third party sources<sup>6</sup>. These third party sources also create a separating equilibrium between high and low quality producers because buyers and intermediaries are aware of costs – e.g., financial and/or reputational – these sources may incur by transmitting signals, and believe that they would not jeopardize incurring these costs by signaling about producers of inferior quality (Bergh, et al., 2014; Higgins and Gulati, 2003; Ippolito, 1990). The value of each kind of signal from each kind of source is confirmed based on other producers who, in the past, received the same kinds of signals from the same kinds of sources and outperformed their rivals (Bergh et al., 2014).

## 1.1 MAIN THEORETICAL THEMES

In this section, the four themes that conjoin the four studies in this thesis are discussed. The first theme focuses on multi-dimensional attributes of sources conveying signals, and the differential effects these attributes have on producers' performance outcomes. The second theme highlights the effects of sets of signals and sets of sources that are interpreted as wholes. In other words, the set is not simply a sum of constituent parts but rather functions as a 'whole' signal itself. In this thesis the following sets are studied: quantities of signals of the same kind, diversity in sources transmitting signals, interaction effects between combinations of signals and source attributes and the effects of sequences of signals, again as predictors of different performance outcomes for producers. The third theme focuses on different kinds of buyers and on intermediation; specifically the extent to which individual signals and sets of signals affect decision making processes of expert buyers and different kinds of intermediaries.

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6. Third parties are the focal sources studied in this thesis, although signals transmitted by first parties, e.g., education, are also studied.

The fourth theme concentrates on signals and sets of signals received in different phases of producers' career trajectories, and the effects on performance outcomes, especially differential persistence.

These four themes were chosen because of their importance to the current debate in various streams of literature and their contribution to salient gaps in that literature. For instance, in general most studies on signals in marketing, management science and entrepreneurship focus on one kind of signal and study the effect of that kind of signal on one particular performance outcome immediately after the signal has been transmitted. In this thesis, different kinds of signals and sets of signals are studied in conjunction with the qualitative attributes of different kinds of sources transmitting those signals. Furthermore, a distinction is made among different performance outcomes, namely: sales price paid, number of sales, reputational rankings, and selection by different kinds of intermediaries. The influence of signals and sets of signals is analyzed, both after the signal has been transmitted and on long-term career effects. To gain a better understanding of persistence in performance, special attention is given to the phase of producers' careers, i.e., nascent phase of competition and later career phases in which signals and sets of signals are received. This level of detail provides greater insights into understating unequal distribution of success in markets with extreme information imperfections about the quality of the products made and sold.

### 1.1.1 Multi-dimensional qualitative attributes of sources conveying signals

The first theme focuses on distinctions among sources transmitting signals, paying close attention to qualitative attributes of these sources. An important distinction can be made between signals transmitted directly by the producer, the so-called first party source, and those transmitted by third party sources that evaluate producers' quality and disseminate that information to a broader public (Sauder, 2006).

First, signals from first party sources have been studied in the field of marketing and, for instance, focused on advertising (Sridhar, Germann, Kang, and Grewal, 2016), brand prominence (Han, Nunes and Drèze, 2010), and warranties (Chu and Chintagunta, 2011). In addition, management science literature has placed emphasis on board member characteristics (Certo, 2003), CEO background (Zhang and Wiersema, 2009), and top management team characteristics (Lester, Certo, Dalton, Dalton and Cannella, 2006). And within the field of entrepreneurship studies have focused on founder involvement (Busenitz, Fiet and Moesel, 2005; Ahlers, Cumming and Günther and Schweizer, 2015), and franchisors (Michael, 2009). These different streams of literature show how signals conveyed by producers provide quality information to potential buyers and decision-makers. However, because of the obvious self-interest in influencing the behavior of others, it is possible that signals conveyed by these sources may be perceived as being biased.

Second, signals from third party sources, in contrast to first party sources, are more likely to be perceived as fair and accurate (Lampel and Shamsie, 2000; Pollock and Rindova, 2003) because if they do not than these sources risk incurring costs, e.g., financial and/or reputational, and jeopardizing their position in the market (Spence, 1973; Ippolito, 1990; Bergh et al., 2014). Earlier studies have shown that signals from third party sources help shape producers'

reputations (Higgins and Gulati, 2003; Deephouse, 2000) and help define status hierarchies (Scott, 1994; 1995). The literature in marketing on signals transmitted by third party sources has focused on the effects of reviews (Eliashberg and Shugan, 1997; Basuroy, Chatterjee and Ravid, 2003) and awards (Anand and Watson, 2004; Gemser, Leenders and Wijnberg, 2008); while the management science and entrepreneurship literature has focused on the effects of prestigious affiliations (Pollock, Chen, Jackson and Hambrick, 2010; Pollock, Porac, and Wade, 2004) venture capitalist backing (Gulati and Higgins, 2003), credentialing devices such as certifications and reputational rankings (Rao, 1994; Rindova, Williamson, Petkova, and Sever, 2005; Deephouse, 2000).

Nevertheless, not all third party sources transmit signals that are equally persuasive; one reason for this is that the strength of the signal is dependent upon the level of credibility of the third party source transmitting the signal (Sternhal, Dholakia and Leavitt, 1978; Pornpikpapan, 2004). Expertise and trustworthiness are two components of the source credibility construct (Ohanian, 1990); the former referring to the extent to which a source is perceived to have knowledge and experience (Hovland, Janis, and Kelley, 1953; Ohanian, 1990), and the latter refers to the extent to which buyers perceive a source to be honest and dependable (Hovland et al., 1953; Meyer, 1988; Newell and Goldsmith 2001; Ohanian, 1990). For instance, if we refer back to the cartoon with the middle-aged couple looking at the contemporary work of art, a distinction can be made between winning the *Turner Prize*, which is bestowed annually by the Tate Britain in London, or winning another award such as *The Best Brush Stroke Award*, from a local business dealing in art supplies. Although in both cases the signals are awards, and both signals are transmitted by third party sources, the relative credibility of these sources is different. Similarly, having an exhibition at the Museum of Modern Art (MoMa) in New York City is different from an exhibition at an art space provided by a local business. Again, both exhibitions are signals of quality, but the relative expertise and trustworthiness of the sources transmitting each signal are different, and this affects the persuasive strength the signal has on influencing purchase decisions. This differential effect can be explained by attribution theory (Kelley, 1967), which specifies that buyers and decision-makers do not accept signals simply at their face value, but rather based on their perception of the sources' levels of expertise and trustworthiness they first evaluate the ability of the third party sources to communicate unbiased and accurate information before they accept the quality information provided by the signal (Kelley, 1967; Eagly and Chaiken, 1975; Mizerski, Golden and Kernan, 1979; Kirmani and Rao, 2000).

The credibility of the source can also depend on the stake the third party source has in the performance of producers who are subjects of the signals transmitted by that source. In this thesis, a distinction is made between third party sources with a financial stake in the producer and third party sources without. This distinction adds to the extant explanations of the credibility differentials of third party sources and their eventual impact on producers' performance outcomes. As such, this is one of few studies that focus on the source credibility dimension in the signaling literature.

### 1.1.2 Signals of the same kind and sets of signals of different kinds

The core focus of the second theme is on sets of signals, studied as wholes. In general, the quantity of signals, the diversity of sources transmitting those signals, interactions between signals and source credibility, and sequences of signals may function as aggregate indicators of quality, and help reduce heterogeneous quality information and transform it into a common metric (Espeland and Steven, 1998).

First, emphasis is placed on understanding the effects of diverse sources transmitting signals about focal producers in a given time period and the quantity of signals – from the same and different sources- on performance outcomes in different time periods. Second, specific attention is paid to the interaction between different kinds of signals and different kinds of sources and the effects on producers' short and long-term performance outcomes. Interaction effects occur when signals become stronger in combination with characteristics of the source. Referring back to the cartoon with the middle aged couple staring at the painting, after the subtext describing the different kinds of signals from different sources had been added: The overall effect of exhibiting at the Gagosian gallery *and* winning the Turner prize can be higher than the sum of the effects of the individual signals. Similarly, the effect of a review in a highly credible media outlet, e.g., The New York Times, will most likely have a stronger effect on performance outcomes than a review in a local newspaper.

Finally, the effect of a sequence of signals on performance is studied. A sequence is comprised of events, e.g., signals, which can be ordered over time (Abbott, 1995). Particular sequences, and the temporal order of signals received, can strengthen the effects of the individual signals in the sequence because the sequence as such is not just the sum of its parts but rather is conjoined as a signal in and of itself (Rindova, Ferrier and Wiltbank, 2010). The sequences studied in this thesis reflect the stake the third party source has in transmitting the signal about a focal producer; for instance an affiliation with an art gallery is a signal in which the third party source, i.e., the art gallery, has a direct financial stake in a producer, while an award is a signal in which the third party source transmitting the signal does not. Referring back to the signals in the hypothetical sequence - winning the Turner Prize *after* affiliating with Gagosian Gallery, or the reverse - provides an additional layer of understanding, above and beyond the effects of the individual signals and their possible interactions. In this thesis, sequences of signals are studied in relation to events immediately following them, but also in achieving a competitive advantage in the long run.

### 1.1.3 Effect of signals on different kinds of buyers and different kinds of intermediaries

The third theme centers on the extent to which signals and sets of signals transmitted by different sources with different qualitative attributes affect sales to different kinds of buyers and influence different kinds of intermediaries' choices in their selection of one producer over another. First, a general distinction is made between different kinds of buyers, namely: experts and non-experts. The former refers to individuals with high-levels of skill by virtue of their specialized knowledge and professional experience with the products and/or producers in a focal market (East, 1992; Alba and Hutchinson, 1987; Moorthy et al., 1997); the latter refers to relatively uninformed buyers who lack familiarity and expert knowledge about the products and/

or producers they are considering to purchase (Moorthy, Ratchford, and Talukdar, 1997; Huang, Lurie and Mitra, 2009). In this thesis, the focal buyers studied are expert buyers, particularly curators employed at organizations with corporate art collections<sup>7</sup>, and to a lesser extent museums and private collectors<sup>8</sup>, active on the primary market for contemporary visual art. Non-expert buyers are only studied in the context of art auction sales.

Second, intermediaries, or gatekeepers as they are sometimes referred to in the cultural industries literature (Becker, 1982; Caves, 2000; Hirsch, 1972, 2000), function as vanguards and have an important role, especially the impact of their decisions on producers' market access and attention, which help co-determine eventual market success (Hirsch, 1972; Peterson, 1997; Glynn and Lounsbury, 2005; Foster, Borgatti and Jones, 2011). For instance, on a micro level, intermediaries have been shown to help shape content of creative products (Peterson, 1997), promote products and/or producers creating the products (Hirsch, 1972; Hsu, 2006), or selectively grant producers access to their networks (Gould and Fernandez, 1989). And on a meso level, intermediaries have been shown to influence the level of product diversity in a market (Foster et al., 2011). In this stream of literature, intermediaries have been described as being co-producers (Peterson, 1997), tastemakers (Hirsch, 1972; Hsu, 2006) or selectors (Gould and Fernandez, 1989; Foster et al., 2011; Gemser, Leenders and Wijnberg, 2008; Ebbers and Wijnberg, 2012).

In this thesis, the extent to which signals and sets of signals transmitted by first party sources and different kinds of third party sources with different levels of credibility influence which producers are chosen by different kinds of intermediaries, i.e., selection committees and core mediators, are analyzed in detail. Core mediators can bestow full legitimacy to the producers they select, effectively granting them immediate access to an existing and previously unattainable buyer base for which they must compete, as fully-fledged and legitimate competitors with other fully legitimate producers. Selection committees, especially those selecting for prestigious educational or professional programs, must choose a few potentially excellent applicants from a large pool of good applicants, mostly making their decisions under conditions of extreme uncertainty about applicants' current quality and future developmental potential. Effectively, selection committees are at the forefront of the intermediation process, the other intermediaries and core mediators usually affect careers more strongly in later phases.

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<sup>7</sup> Over half of the Fortune 500 companies have a corporate art collection (Kottasz, Bennett, Savani, Mousley, and Ali-Choudhury, 2007; Kottasz, Bennett, Savani, and Ali-Choudhury, 2008), employing expert buyers who mostly purchase art for these collections on the primary art market (Wu, 2002).

<sup>8</sup> The private collectors studied collect contemporary visual art collectors and on average purchase at least five new artworks annually at art fairs and art galleries. Many of these experienced private collectors have been collecting art on the primary art market for at least a decade, and employ expert buyers to help them build their art collections.

#### 1.1.4 Effect of signals and sets of signals on different phases of producers' career trajectories

The fourth theme focuses on the extent to which signals and sets of signals transmitted by third party sources about producers in different phases of competitive activity can differentially affect performance outcomes. First, signals and sets of signals can function as determinants of producers crossing the so-called legitimacy threshold (Zimmerman and Zeitz, 2002; Rutherford and Buller, 2007; Rutherford, Buller, and Stebbens, 2009), effectively exiting nascency, and continuing on as fully fledged and legitimate competitors. Second, signals and sets of signals as determinants of persistent performance differentials – in different career phases – are studied to gain a better understanding of inequalities in the distribution of success in markets with incomplete and imperfect information about quality.

First, nascent producers face challenges at market entry because they might lack legitimacy. Legitimacy is the degree to which a producer is perceived to be pursuing activities associated with accepted norms, values, beliefs and expectations of the group to which he/she belongs (Suchman, 1995). New producers are at a competitive disadvantage because they suffer from a liability of newness (Stinchcombe, 1965) in the sense that they usually lack experience, do not have established networks, and encounter difficulties in getting access to resources. One way for producers to overcome this liability of newness is to gain legitimacy (Stinchcombe, 1965; Hannan and Freeman, 1984; Singh, Tucker and House, 1986; Shepherd, Douglas, and Shanley, 2000). Crossing the legitimacy threshold is a crucial event in the nascent phase of producers' careers because it unambiguously conveys full legitimacy of those producers to buyers and intermediaries active in a focal market (Zimmerman and Zeitz, 2002; Rutherford, Buller, and Stebbens, 2009; Rutherford and Buller, 2007).

Referring back to the cartoon with the middle-aged couple contemplating the painting, the producer who painted the contemporary work of art is obviously fully-fledged and legitimate, as can be observed in the hypothetical scenario of many different kinds of signals transmitted exclusively by highly credible sources; Presumably, this producer was once exposed to the liability of newness in the nascent phase of competitive activity. This theme focuses on what happens before the legitimacy threshold is crossed; specifically, the extent to which signals and sets of signals from third party sources with different levels of credibility help determine whether a legitimate core mediator, in this case an art gallery, decides to affiliate with the producer, effectively bestowing full fledged legitimacy to that producer in the eyes of potential buyers.

Second, as mentioned earlier, many markets are characterized by high pre-consumption quality uncertainty (Nelson, 1970; 1974), and in particular markets, e.g., the primary market for contemporary visual art, post consumption quality may also be difficult to discern (Darby and Karni, 1973). Nevertheless, some producers systematically and persistently outperform their competitors. Especially in the presence of uncertainty about quality and unobservable heterogeneity of producers' individual characteristics, e.g., ability, perseverance, the cause of inequality in the distribution of success is not easily explained. This is even more so in situations where many competitors have equal schooling and training. Precisely in such contexts, particular signals and sets of signals could have a powerful effect on setting in motion the self reinforcing processes that underlie the persistent performance. It is possible that these signals

may function as hard-to-imitate resources (Merton, 1968; Azoulay et al., 2013; Waguespack and Salomon, 2015). Such hard-to-imitate resources can lead to sustainable competitive advantage for a few producers. This can occur at any phase of producers' careers (Merton, 1968), although earlier research has shown that often seemingly inconsequential performance differentials gained in the nascent phase of competitive activity may become magnified into extremes later in producers' careers (Merton, 1968; Azoulay et al., 2013; Gould, 2002). More specifically, this thesis will explore whether signals originating from diverse sources and with different levels of credibility or with different kinds of stakes in the producer who is the subject of the signal contribute to persistent performance differentials. Again, not just the effects of individual signals will be studied, but also the effects of sets of signals, sets of sources and sequences, especially those occurring at the very start of the competitive career.

## 1.2 EMPIRICAL SETTING

### 1.2.1 Contemporary visual art market

Paintings, sculpture, photography, drawings, and art videos are examples of fine art products sold in the contemporary visual art market, the focal setting of this thesis. As mentioned earlier, this market consists of the primary market, where artworks are sold for the first time either directly by the artist or through intermediaries such as an art gallery, and the secondary and tertiary art markets, where artworks are re-sold through intermediaries and art auction houses, respectively (Singer and Lynch, 1994). Art products can be described as non-material, serving an aesthetic or expressive function rather than a utilitarian one (Hirsch, 1972). To gain a fine-grained understanding of how individual signals and sets of signals from different sources with different levels of credibility influence performance outcomes for producers active in the contemporary visual art market, data from several sources was used to create three unique databases.

In the next section, a general description of the two main sources of raw data, i.e., Gerrit Rietveld Academie and the Rijksakademie van beeldende kunsten, as well as the three core sources of sales data will be discussed. This is followed by a summary describing the three data sets, a description of the empirical strategy and finally, the structure of this thesis is presented.

### 1.2.2 Multiple sources of data

The raw data originates from two art institutions in the Netherlands: the *Gerrit Rietveld Academie* and the *Rijksakademie van Beeldende Kunsten* (RABK). The Gerrit Rietveld Academie is a well-known and prestigious art school that offers two undergraduate programs, a Bachelor in Fine Arts and a Bachelor in Design. Originally founded in 1924 as the Institute for Education in the Applied Arts, the name was changed to the Gerrit Rietveld Academie in 1968, in honor of the architect and furniture designer Gerrit Rietveld, who designed the building where the school has been located since 1967. In recent years, there have been approximately 850 students in attendance annually; close to 70% are international students and the average age of a freshman is 21. Roughly 1000 applicants apply every year and around 250 are accepted. ([www.gerritrietveldacademie.nl](http://www.gerritrietveldacademie.nl)).

RABK is an internationally renowned visual arts program that is held in high esteem by the

international art community. Founded in 1870, as a classical art academy, RABK offers a two-year residency to autonomous visual artists. As a residency program, RABK grants selected artists financial support, studio space, technical facilities, workshops, podia for presentations and networking opportunities so that they can focus on further developing their art practice through research, experimentation, innovation and critical discourse (Rijksakademie Annual Report, 2014). RABK is extremely selective: on average 1000 applicants apply annually and approximately 27 are accepted of which more than 70% are from abroad. The average age of a first year resident is 29 years old, and more than 95% have received a bachelor and/or master degree in fine arts or in a related discipline. Although often referred to as a post-graduate program, RABK does not grant a degree upon finishing the residency ([www.rijksakademie.nl](http://www.rijksakademie.nl)).

Sales data originates directly from the different kinds of expert buyers located in the Netherlands, namely: curators employed at organizations with corporate art collections, museums and private art collectors. First, access to the curators of corporate art collections was facilitated through the Netherlands Association of Corporate Art Collections (VBCN). Thirty-five member organizations were approached and asked to participate in this study; 63% replied favorably and supplied sales data, i.e., price paid per artwork and date of purchase, about artists in their collection who were RABK residents from 1986 to 2012. The member organizations of the VBCN that participated in this study<sup>9</sup> account for 77% of the sales made to corporate collections in the Netherlands during our observation period ([www.vbcn.com](http://www.vbcn.com)). Second, the Stedelijk Museum Amsterdam and De Pont Museum in Tilburg supplied extensive sales data, i.e., price paid per artwork and date of purchase, again concerning artists in their collection who were RABK residents during the above mentioned observation period. Finally, the private collectors who participated in this study were either Dutch nationals or resided at least partly in the Netherlands. These private collectors were approached through snowball sampling; a core criterion for participation was that private collectors purchased at least five new artworks annually at art fairs and art galleries. Most participants provided detailed listings of artworks they purchased from artists who had attended RABK during the observation period, including both sales price paid and date of purchase.

### 1.2.3 Summary of data

The data retrieved from the Rietveld Academie and RABK consisted of biographic information: artist name, date of birth, gender, nationality, and education. RABK also supplied the following data: newspaper clippings, award records, reviews, listings of exhibitions and art fairs, magazine articles, and gallery information. The signal data about the Rietveld Academie alumni was collected through an Internet survey. Triangulation using publically available sources, e.g. art market websites: Artfacts.net<sup>10</sup>, Artnet.com<sup>11</sup> and artists' CVs cross-validated the accuracy of both data sources; and thereafter, made amenable to econometric analyses. Additionally, longitudinal selection data from RABK was collected. These data comprised detailed application

<sup>9</sup> Members of VBCN that participated in this study: ABN AMRO, Achmea, Aegon, Ahold, AkzoNobel, AMC, DNB Bank, DSM, Erasmus MC, ING Bank, KPMG, KPN, LeasePlan, LUMC, OCE, Provincie Limburg, RaboBank, Rabo Vastgoedgroep, Sanquin, Stichting Beheer SNS Real, Theodoor Gilissen, and UMC.

<sup>10</sup> ArtFacts.Net, which was established in 2001, is a website that ranks contemporary visual artists based upon their annual exhibitions at galleries and museums worldwide

<sup>11</sup> Artnet.com, which was founded in 1989, is an art market website that provides detailed information about more than 9 million public art auction results from 1,600 international auction house.

information and comprehensive jury notes about applicants invited to the last phase of selection: the interview round. RABK does not use formal selection criteria; nevertheless, interviews with jury members and non-participatory observation of selection rounds provided information enabling the construction of such criteria. Based upon these criteria, three raters scored the jury notes, which had been transcribed verbatim, and inter-rater reliability was calculated.

In total, 1590 artists' career trajectories were studied from 1986-2012, with a maximum observation period of 26 years and a minimum of four. The level of source credibility<sup>12</sup> of 967 third party sources was determined for 5236 signals, i.e., 3582 reviews, 947 awards, 253 merit based subsidies, and 454 affiliations with art galleries, and these effects were estimated on 1164 sales transactions to different categories of buyers active on the primary art market and to a lesser extent the auction market.

### 1.3 EMPIRICAL STRATEGY

This thesis consists of four quantitative studies conducted in the empirical domain of the contemporary visual art market. Particular emphasis is placed on a salient characteristic of this empirical setting: highly skewed right-tailed distribution of success. Information about artists with signals and sales in a particular period or periods of competitive activity *and* artists without is incorporated into the analyses. Especially since not having a signal or not having a sale can be interpreted as a signal in and of itself. Hence, mostly non-parametric and semi-parametric models - i.e., switching regressions based on the Heckman two-stage model, Poisson regressions, Cox event history and competing risks analyses - were used to estimate these data.

To address potential selectivity in the empirical analysis in Chapter 2, switching regressions based on parametric and semi-parametric two-step selection models are used to estimate performance outcomes in the cross section data (Heckman, 1974,1976; Newey, 1999). In Chapter 3, Poisson regressions with cohort fixed effects and discipline fixed effects are used to estimate the panel data. Poisson regressions provide consistent estimates even when the dependent variable is not an integer (Santos Silva and Tenreyro, 2006, 2011). Interaction effects between the number of signals and the level of credibility of the third party sources transmitting those signals are also analyzed in Chapter 2. One way to estimate interaction effects in non-linear models is described in Dhar and Weinberg (2016) and Ai and Norton (2003). These papers show that nonlinear models inherently include interactions among the variables, so that specific interactions terms do not need to be added to the model. In Chapter 4, Cox semi-parametric models and competing risks analyses are used to estimate the time-to-event for cross-section data. Although the underlying probability density function for the baseline hazard is unknown, estimates from these models are consistent because the proportional hazards assumption have been met. And in Chapter 5, fixed effects regressions for panel data are used. A fixed effects approach to analyzing longitudinal data is a useful specification because it captures individual time invariant unobserved heterogeneity while constructing a recursive structure by following individuals over time (Greene, 2003).

<sup>12</sup> First, an expert panel of judges determined source credibility using a multi-item scale measuring expertise and trustworthiness (Ohanian, 1990). Second, inter-rater reliability was calculated to measure the homogeneity of measurements given to the same sources by different judges. Third, absolute agreement among the expert judges was measured and was higher than 0.70, which is an acceptable value (Shrout and Fleiss, 1979).

## 1.4 STRUCTURE OF THE THESIS

The four themes discussed earlier are common threads that weave across the four core empirical studies. The effects of qualitative source attributes (Theme 1) and sets of different kinds of signals transmitted by different kinds of sources (Theme 2) on different kinds of buyers and different kinds of intermediaries (Theme 3) at different phases of producers' career trajectories (Theme 4) interconnect, as leitmotif of this thesis, the four quantitative studies are introduced below.

In **Chapter 2** emphasis is placed upon gaining a better understating of the predictive value of multiple selection criteria used by committee members to select potentially excellent individuals from a large pool of applicants to a prestigious educational program. Concentrating on the scores applicants' received on these criteria as well their biographical data, acceptance to the program and future performance are estimated. In this chapter, signals and sets of signals transmitted by the individual applicants in their early phase of competitive activity are studied, and a comparison is made across two groups: accepted and rejected applicants. This provides a better understanding of the extent to which signals and sets of signals *and* the credibility dimension of the source transmitting the signals influence a specific kind of intermediary, i.e. selection committees. Based upon the scores applicants received during the semi-formal selection process, predictions are made about both groups' future performance outcomes, i.e., reputational rankings and sales.

**Chapter 3** concentrates on past signals and past performance, as hard-to-imitate non-material resources, and studies the extent to which it affects self-reinforcing processes in competitive dynamics during different phases of producers' career trajectories and sales to expert buyers. Emphasis is placed upon quantitative characteristics of the signals and the qualitative attributes of the sources conveying those signals as well as past performance to gain a deeper understanding of how inequalities in the distribution of success are initiated and maintained, specifically in a market where the underlying quality differences among producers are hard to observe.

**Chapter 4** focuses on source attributes as well as source diversity. Particular emphasis is placed on understanding the effects of diverse kinds of sources; specifically, the extent to which source diversity, interpreted as a 'whole' signal, affects a particular kind of intermediary: the core mediator. As mentioned earlier, core mediators, by the sheer virtue of the signals they transmit, allow new producers to cross the so-called legitimacy threshold and be granted full legitimacy. In this chapter, the accent is placed on how signals from third parties with different levels of credibility *and* different levels of diversity influence the explicit decision of a core mediator to allow the new producer to gain immediate access to the market as a fully legitimate competitor.

**Chapter 5** centers on gaining a deeper understanding of two constituent parts of source credibility: independence in making evaluations and costs of signaling, particularly penalty costs third parties are willing to incur if there is the belief that the quality information conveyed is false or erroneous. Focus is placed on the first sequence of signals a producer receives in the nascent phase of competitive activity; specifically, signals that originate from different types of third party sources with different stakes in the future success of the subject of their signals. In this chapter, the commutativity of source credibility in the first sequence of signals is studied, particularly in relation to the differential effects the temporal order has on long-term financial success. Finally, Chapter 6 presents a discussion of the results from these four core empirical studies framed within the context of the four core themes. Conclusions follow.

## CHAPTER 2

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### **PICKING THE CREAM OF THE CROP:** A Study on the Effectiveness of Jury Selection to a Prestigious Art Academy

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## ABSTRACT

Research on the selection of applicants to academic programs has generally focused on formal admission criteria, emphasizing the role of objective, unequivocal measurements of scholastic merit. We study a new domain: selection to an elite visual arts program, where selection procedures are semi-formal, with specific focus on assessing applicants' latent or hard-to-observe quality and developmental potential, rather than simply past achievements. We analyze 11 years of comprehensive selection committee deliberation notes, and identify multiple selection criteria used by committee members to select potentially excellent individuals from a large pool of applicants. Based on applicants' scores on these criteria and their biographical data, we estimate (1) acceptance to the program and (2) future performance, i.e., auction sales and reputational rankings of artistic standing using switching regressions. We find that multiple selection criteria have predictive value: receiving high scores on criteria, as well as the final jury assessment, are positively correlated with admission and better reputational rankings, but not with sales.

**Keywords:**

*selection, artistic labor market, prestigious education, switching regressions*

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## 2.1 INTRODUCTION

Selection processes focused on choosing the *right* applicant from a pool of applicants are common in many settings, ranging from hiring employees or managers to choosing participants for scholarly or professional programs. In these selection processes decisions have to be taken under conditions of uncertainty. Information about the present characteristics of the applicants is always imperfect, and even more so about their future potential in an uncertain future environment. To reduce uncertainty, many selection committees rely on selection criteria to help them choose potentially excellent applicants among the many competing alternatives. Choosing the right applicant is important because the costs associated with making the *wrong* selection can have far reaching negative financial and/or reputational impact on the selectors, applicants and the competitive landscape of a market.

Throughout history there have been striking examples of selection misjudgments. For instance, at age 16 Albert Einstein was first rejected by the prestigious Swiss Federal Polytechnic Institute (ETH) in Zurich only to be accepted a year later; Fritz Kreisler, acclaimed as one of the world's top violinists of the twentieth century was rejected by the Wiener Philharmoniker and initially reacted by studying medicine instead; two time Academy Award winner, Steven Spielberg, was rejected twice from the elite film and theater school at the University of Southern California. These types of misjudgments are not rare. To reduce the risk of rejecting potentially excellent applicants or selecting inferior ones, selection committees often assess the information provided during the selection process along different dimensions, using multiple criteria of quality. Designing a selection procedure, developing such criteria, and involving qualified selection committee members is both a time-consuming and a costly process (Klitgaard, 1985), but especially at elite institutions, choosing a limited number of potentially excellent candidates from large pools of applicants might just be worth spending resources on.

The core aim of this paper is to gain a better understanding of the predictive value of multiple selection criteria used by a selection commission to evaluate applicants' latent or hard-to-observe quality and developmental potential. We identify these criteria and analyze the extent to which they predict: 1) admission to the program, 2) later sales performance and reputational rankings for both the accepted and rejected applicants, and 3) the extent to which these criteria overlap in predicting both selection and future performance. We analyze the final round of a selection process, in a procedure where the large number of applicants necessitates a mostly administrative pre-selection.

Extant research on selection processes has focused on settings with formal admission procedures, in which selection decisions are based either on objective measures, e.g., grades and standardized test score, (e.g., Grove and Wu, 2007; Ehrenberg and Marvos, 1995; Van Ours and Ridder, 2003; Klitgaard, 1985), or subjective measures, but rooted in formal structures and binding procedures on the basis of expert opinions (e.g., Glejser and Heyndels, 2001; Ginsberg and Van Ours, 2003). We focus on a setting in which the selection process is semi-formal, and admission decisions are based on applicants' latent quality and potential future development, making this an excellent setting to study the predictive value of multiple selection criteria.

The empirical setting of our study is the contemporary visual arts market, which is known to

have an oversupply of producers, uncertain demand and no objective measures of determining product or producer quality (Caves, 2000; DiMaggio, 1987; Yogev, 2010; Velthuis, 2013). We study the selection process at the *Rijksakademie van Beeldende Kunsten* (RABK), an internationally renowned and prestigious visual arts residency located in Amsterdam, the Netherlands. The goal of RABK is to select the most talented visual artists and offer them a platform where research, experimentation, innovation and critical discourse are central, complemented with technical facilities, workshops, podia for artistic presentations and networking opportunities (Rijksakademie Annual Report, 2014). To fulfill this goal RABK invests heavily in talent scouting and development, which starts with a rigorous selection process. During our 11-year observation period, 9249 visual artists from across the globe applied to RABK and on average 27 were accepted every year. In accordance with RABK goals, the selection committee, consisting of internationally renowned visual artists, spend five weeks every year selecting a few potentially talented visual artists to allow them to further develop and deepen their art practice ([www.rijksakademie.nl](http://www.rijksakademie.nl)). Being admitted to an elite program, such as RABK, can positively affect later performance. To address potential selectivity in our empirical analysis, we use switching regressions based on parametric and semi-parametric two-step selection models (Heckman, 1974, 1976; Newey, 1999).

The paper is organized as follows: In Section 2 we discuss existing literature on selection processes to academic and other specialized programs. Section 3 provides a detailed description of the empirical setting and evolution of selection procedures at RABK. Section 4 presents the data and descriptive statistics. Section 5 discusses differences among performance of accepted and rejected artists. Section 6 analyses the admission decision in greater detail, and presents the switching regressions as our analytical strategy to test if admitted candidates perform better than the rejected ones. Section 7 presents results from robustness tests and simulates alternative admission procedures and their consequences. We present our conclusions in section 8.

## 2.2 THEORETICAL FRAMEWORK

Predicting success in economic and artistic life is notoriously difficult, as several strands of literature indicate. Occupational psychology claims that the benefits of testing job applicants, for higher productivity, can outweigh the cost of testing (Cascio, 1999) even though explained variance in job performance is not high. Van der Maesen de Sombreff (1992, p 11) lists results from meta analyses of several types of variables. The highest score is for cognitive abilities, biographical data and structured assessment of training and experience, with each an average  $R^2$  of about 0.25. Structured interviews score slightly lower, at about 0.16. Unstructured interviews score no higher than 0.06, personality questionnaires; unstructured assessments of training and experience and average school grades score even lower. Wright, Lichtenfels, Pursell (1989) also note that structured interviews give better results than unstructured interviews. In another stream of literature, i.e., labor economics, success is measured as earnings. Individual earnings functions usually only explain a tiny fraction of the variance (Hartog, 2001; Taubman, 1975). The most powerful variable is (years of) schooling. Abilities and personality variables have an

impact but their explanatory power is weak (Hartog, 2001); although with sufficiently strong econometric modeling, personality variables can make a significant contribution (Borghans, Duckworth, Heckman, Ter Weel, 2008).

The literature on predicting academic success, at the advanced level, generally finds that grades or standardized test scores affect selection decisions. Although the empirical literature is quite modest about the benefits of an elite education, a few papers consider the success of selective admission to economics PhD programs. Ehrenberg and Mavros (1995) find that GRE scores predict selection, but fail to predict PhD completion or time-to-degree for economic PhD students at Cornell University. Groove and Wu (2007) analyze the probability of PhD completion and research productivity of all applicants to a top-five economics PhD program in the US in 1989. They find that the committees' subjective ratings of applicants have clear predictive value, 'but do not encompass the information contained in the applicants' file.' Research on committees comprised of peers has shown that peer based selection is a useful way of maintaining high quality standards (Kostoff, 1997) because peers are best able to judge novelty and contribution of output (Eisenhart, 2002). Past studies have shown that agreement between peers involved in selection processes is strongly correlated with future positive selection outcomes (Cole and Simon, 1981; Bornmann and Daniel, 2005). Nevertheless, these studies relied heavily on objective criteria such as standardized test scores and high school grades (Grove and Wu, 2007; Ehrenberg and Mavros, 1995; Van Ours and Ridder, 2003), the status of the applicants' previous educational institution, and letters of recommendation (Klitgaard, 1985; Grove and Wu, 2007); there is also specific focus on the effects of financial support (Ehrenberg and Mavros, 1992; Booth and Satchel, 1995) and supervision (Van Ours and Ridder, 2003; Hilmer and Hilmer, 2012; De Valero, 2001). Grove and Wu, (2007) have noted that the highest predictive value obtains from subjective rating combined with administrative data, i.e., committee ratings alone predict less accurately than all administrative variables combined. In short, these studies found that past scholastic output affects future performance, e.g., job placement, but fail to offer any reasons for this strong correlation. To try to gain a better understanding of this relation, Athey, Katz, Krueger, Levitt and Poterba (2007) ask the following questions: Does education teach useful skills that are employable later in life? Or are students with higher grades more self-confident, thus more likely to find a better job? Or are cognitive abilities coupled with diligence and creativity truly important traits to achieving future success? Yet, they too are unable to unambiguously explain this correlation, and instead conclude, "our results suggest that there is not an easy recognizable star profile or single path to success" (Athey, et al., 2007, p. 518).

In a different stream of literature focusing on predicting success at contests and competitions with highly structured selection processes, Glejser and Heyndels (2001) found that distortions of efficiency such as strategic voting by jury members, self-selection of participants, discrimination (by gender), type of work performed, and conditions of performance, e.g., time of day and day of the week can affect the outcomes of candidates competing in the Queen Elizabeth (QE) Contest. For instance, Ginsberg and Van Ours (2003) found that candidates who performed later during this contest had higher rankings, regardless of their quality<sup>13</sup>. In a related study on elections of Econometric Society Fellows, Hamermesh and Schmidt (2003) conclude that highly structured selection processes are often influenced by other factors that may not be directly related to the candidate's research quality, yet affect performance outcomes.

This review of related literature indicates that we should not anticipate a very precise and effective selection procedure, in particular as the RABK selection process is fairly informal, as a non-structured discussion based on subjective assessments: "the final selection is made collectively based on each group's assessment". There is no formal voting, no explicit grading on explicit criteria. This is in contrast to objective formalized decision making, with thresholds for grades on objective, unequivocally measured variables (diploma yes/no, school grades, publication scores), or subjective formalized decision making with binding procedures on basis of expert opinions, as in the QE Contest. But as these features are not unique to the RABK it is certainly worthwhile to analyze the workings and results of the process.

## **2.3 EMPIRICAL SETTING**

### **2.3.1 Evolution of the selection process**

RABK was established in 1870 as a classical art academy, focusing exclusively on teaching skills used to make art. In the late 1980s, RABK began transitioning from a classical art academy to becoming a two-year artists' residency program, in which the focus from teaching the technicalities of fine art disciplines, such as painting and sculpture, shifted to a new domain: research, experimentation, innovation and critical discourse (Rijksakademie Annual Report, 2014).

Since their development as an art residency program, there has been a steady evolution in their selection process. There are three distinct phases in which selection procedures changed. In the first phase, which lasted from 1990-1993, a jury member specialized in a specific art genre solely evaluated applicants within that core discipline. In 1992 no selection took place because of organizational restructuring and location change. From 1993 onward, the residency period of two years was based on the calendar year, January to December, and no longer an academic year.

In the second phase, which lasted from 1994-1998, there were two jury groups, namely: one specialized in two-dimensional work such as painting, drawing, photography and graphic design, and the other one specialized in three-dimensional work such as sculpture but also film and art video.

Each jury group first considered applicants from their core disciplines, then jury members from each respective group considered the other groups' applicants, and lastly, based upon discussions among all jury members, applicants were selected for an interview. At the interview phase, the jury of the core discipline of the applicant made the final selection. In 1998, an extra Dutch selection was added so that Dutch applicants could bring in original work for viewing.

And in the third phase, starting in 1999 until 2010 the last date of our data collection, selection was not based upon core disciplines but rather the jury consisted of multi-disciplinary groups who assessed the work from all applicants. A pre-selection round was also introduced. In 2006 the applicants in the selection procedure were sub-categorized into Dutch and foreign. And finally, in 2009, due to the large amount of applicants a (pre-)pre selection round was introduced which included applicants who are not in the target group. Our observation period begins in 1995 and ends in 2008; we do not have observations in the first phase, and we control for two years from the second phase by creating a dummy variable coded one for the years 1995 and 1997, and otherwise zero; the rest of our observations are in the third phase.

### **2.3.2 Selection Rounds**

Since the 1990s, RABK has had an interview round in their selection process, regardless of the number and types of preceding rounds, although as the number of applicants increased, so did the number of selection rounds. The number of applicants tripled from 1995 to 2010, necessitating the introduction of a (pre-) pre selection round and a pre selection round for both Dutch and foreign applicants preceding the selection and interview rounds.

Particularly for international applicants, the (pre-)pre selection round consists of individuals who are not in RABK's target group. These applicants are younger than 26 or older than 36 years old or have less than 2 years art practice experience or do not have a letter of recommendation. This round is characterized by quick viewing of (audio-) visual work and usually most applicants in this round will be rejected. The ones who do proceed to the next round usually have either been to an interview in a previous year or are younger artists whose visual work is striking.

Those applicants who do fit the explicit age and experience criteria are included in the so-called pre-selection. This round is sub-divided into Dutch and foreign candidates, and is composed of individuals who are in the target age group of 27 to 36 years of age and have two or more years of individual art practice experience but do not have a letter of recommendation. Both the (pre-)pre selection and the pre-selection rounds are characterized by very quick viewing of artworks projected onto a screen. Main selection criteria in these two rounds are technical skill and autonomous style, i.e., not heavily influenced by a particular style, school or tutor. Artists with letters of recommendations are exempt from either of these rounds. Interestingly, artists who are affiliated with a notable gallery or have an established art practice and display their work at prestigious international exhibitions are usually rejected at this phase of selection. This is a very conscious decision made by the selection committee because of these artists' advanced career trajectories and lack of fit with the objectives of RABK of identifying possibly talented individuals and helping them develop this potential.

Artists then progress to the selection round, which consist of two-parts: first, the selection committee members view submitted artworks per applicant, either digitally by being projected

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<sup>13</sup> Chan, Frey, Gallus and Torgler (2103) give good references to the literature on contests and competitions.

onto a screen or original works. At the end of the first part of this round, jury members are explicitly asked their opinion about applicants' artworks and each juror makes a short list of favorite applicants<sup>14</sup>. In the second part, applicants' description about their work and their expectations from RABK are read out loud, and letter(s) of recommendation are discussed in detail. Recommendation letters are considered very carefully, and if, for instance, an applicant with a letter of recommendation does not proceed to the interview, then the person recommending receives an explanatory e-mail or telephone call from RABK explaining this decision. At the end of this round, each jury member provides either a positive or negative assessment per applicant. In general, applicants with only positive scores from all jury members are invited to the interview.

The interview round consists of applicants assessed by two interdisciplinary jury groups – each group consisting of three renowned visual artists and a facilitator – in a 30-minute interview per group with the applicant. The two facilitators take detailed notes during the interviews. Although RABK does not use formal selection criteria, we were able to determine 11 distinct criteria, based upon extensive analysis of jury notes (discussed in detail in the next section). We found that in the interview round, focus is placed upon 11 distinct criteria and the final jury assessment, covering items such as: developmental potential, i.e., technical and creative processes and connection between art practice and theory as well as individual characteristics, i.e., communication skills and ability to accept critique. After the interview, each group give their assessment, i.e. positive or negative, based on (sometimes) extensive discussions about the applicant<sup>15</sup>. The final admission decision is made collectively after both group evaluations have been made. This final decision does not follow mechanically from the jury group assessment, as other cohort dynamics are also considered, i.e., nationality, artistic disciplines and gender.

## 2.4 DATA

### 2.4.1 Data Collection

We have two sets of data. The first set contains data collected from the application procedure up to the interview round, these data include: age, gender, country of origin, formal art education or not, whether applied (and rejected) before, and letter of recommendation. We will call this biographical data.

The second data set, called jury data, derives from the notes taken during the interview round for applicants to the RABK in 1995, 1997 and 1999 up to and including 2008. We focus on the interview round, where annually 60-65 applicants were invited, for a few reasons: First, the interview round has been the final round throughout our observation period inviting approximately the same amount of applicants every year. Second, this round is exactly documented. Third, selection, compared to the other rounds, is most rigorous in this round. Fourth, multiple selection criteria are implicitly used to judge applicants' potential quality. And fifth, we test if receiving excellent scores on the multiple selection criteria compared to other applicants results in admission. This enables us to assess the predictive value of this selection

<sup>14</sup> The shortlists are not kept on file.

<sup>15</sup> We did not distinguish cases with jury notes from one or from two jury groups: all scores were averaged.

process using multiple selection criteria on not only admission but also on future career performance for both accepted and rejected applicants. In addition to the interview notes, our data contains information from three different sources: interviews with jury members and non-participatory observation to distill the exact selection criteria and weight of each individual criterion.

### 2.4.2 Interviews and non-participatory observation

As the RABK does not have an official list of selection criteria, non-participatory observation and interviews with jury members provided a deeper understanding of the selection procedures, especially in the selection and interview rounds, by helping to identify exact criteria used to assess the applicants and the weight of importance per criterion in each category in these rounds.

Over a four-month period, one of the authors observed two-hours of each type of round<sup>16</sup>; i.e., (pre)-pre selection, pre-selection, selection, and interviews. After each selection and interview round, semi-structured individual meetings with the jury members took place. Each meeting lasted approximately 15 minutes and was designed so that each jury member could rate the importance of various selection criteria that were observed during that round. After these interviews took place, an in-depth interview was conducted with the head of the residency program, who was also a facilitator in the interview round during the past ten years, to assess the accuracy of the multiple selection criteria and to evaluate the jury members' ratings of these criteria. In general, there was agreement among the jury members' rankings and the assessment of these rankings by the head of the residency program; thus no changes were made. Table 1 (see Appendix A) shows the multiple selection criteria with the assigned weight in percentage and importance. A score of one indicated lesser importance, while a score of five reflects great importance in either the selection or interview round.

There is a high degree of continuity in the composition of the jury, with only 9 out of 30 members serving once and 21 members serving in more than one year, and the list may be taken to be valid for our entire interval of observation.<sup>17</sup>

### 2.4.3 Analysis of interview notes

All interview notes have been transcribed *verbatim*, and three raters scored these notes based upon multiple selection criteria observed during the non-participatory observation and interviews with jury members. Of the total number of applicants accepted in our observation period (N=299) we have interview notes for 53% (N=157), of the total number of applicants rejected in our observation period (N=398) we have interview notes for 50% (N=198).

<sup>16</sup> This was the first time RABK had allowed data collection during their selection process. To keep possible interference with the process at a minimum, RABK specified time allocations for non-participatory observation and meetings with selection committee members.

<sup>17</sup> Among the 30 multiple jurors, the full distribution during our observation period: 3 jurors served on 11 selection committees, 2 jurors on 8 selection committees, 5 jurors on 6 selection committees, 2 jurors on 5 selection committees, 2 jurors on 4 selection committees, 4 jurors on 4 selection committees, 3 jurors on 2 selection committees and 9 jurors on 1 selection committee. Moreover, the same facilitator was present.

We used an ICC model<sup>18</sup> to measure the consistency of agreement between the three raters scoring the RABK interview notes on 11 selection criteria and the final jury assessment. Specifically, a two-way random effects ICC model was used and the consistency of absolute agreement between raters per criterion was measured. Absolute agreement refers to the correlation between measurements of the criteria and it is also a ratio of the between target variance to the total variance of measurements in a two way random effects model (Shrout and Fleiss, 1979). The total variance is the sum of the between target, between rater and error variance. The unit of analysis is the mean rating across the three raters, which is useful to use when a group of raters score the same criteria (Shrout and Fleiss, 1979). Our measure of absolute agreement-ICC is denoted as ICC (2,3), meaning we have 3 raters who each rate the same data. The literature concedes that an ICC value of 0.70 or higher is acceptable.

The three raters who scored these data were two master students in Business Administration and one of the authors. These two student raters were chosen because of their general interest in contemporary visual art; namely one rater's mother is a visual artist, and the other rater has taken university level courses in art history, focusing on modern and contemporary art. The two students received a detailed three-hour training session from the third rater about the 11 selection criteria and final jury assessment, and how these criteria were extracted from the non-participatory observation, interviews with jury members and final in-depth interview with the head of the residency program. Additionally, the training session provided the students background information on the various selection rounds at the RABK, particularly the last round – the interview. The selection criteria were explained in detail and a matrix was provided specifying each criterion with examples. Additionally, art specific context and terms were explained. After scoring 100 interview notes based on the selection criteria, the raters met to discuss questions that arose during scoring of the jury notes. These meetings were repeated twice. The students did not receive compensation, but used the collected data as an empirical basis to write their master thesis.

The 11 selection criteria and final jury assessment used to score the interview notes are based on the individual's developmental potential, connection between art practice and theory and individual characteristics, which have been sub-categorized as: content, context, craft, creative, expertise, critique, communication, career fit, collaboration, contradiction, personality, and final jury assessment. The raters read the interview notes and then assigned a value of 1, 2 or 3 to the selection criterion they thought the interview notes addressed. For most criteria, a value of 1 represented a negative jury assessment, a value of 2 represents neutral assessment, and a value of 3 represented a positive jury assessment. With assessing the value 2 if there is no explicit comment in the notes on this criterion, we implement our interpretation that if nothing is said, the candidate apparently scores neither clearly positive nor clearly negative on this criterion.

For two criteria the scales were slightly different, namely: for *contradiction*, a value of 1 represented complete or partial disagreement between jury members, and a value of 3 represented total agreement. In three records, there was no score on this criterion; we assigned a value 3 as silence can express agreement but not disagreement<sup>19</sup>. For *final assessment* a value of 1 represented an overall negative evaluation and a value of 3 represented an overall positive evaluation, while 2 represented a missing value<sup>20</sup>.

TABLE 2.1 Description of selection criteria

- Work related **content** refers to the development of the artist/artworks over time.
- **Context** refers to the artists' understanding of art historical references.
- **Craft** refers to the technical aspects of the artwork/ ability in actually making the artwork.
- **Creativity** refers to the innovative aspects/ novel contribution of the artwork.
- **Expertise** refers to art education or combinations with other academic disciplines, e.g., biology, architecture.
- **Critique** refers to how open the artist is to criticism and change.
- **Communication** refers to the artists' ability to communicate about the artworks, i.e., reason for artwork.
- **Fit** refers to the stage of the artists' career and the fit within the RABK community.
- **Collaboration** refers to if jury member(s) would like to have the artist as a colleague.
- **Contradiction** refers to the level of opposing views between jury members about an applicant.
- **Personality** refers to if the jury liked the personality of the applicant.
- **Final assessment** refers to jury members' overall assessment of the applicant.

On average, the raters were consistent with one another in their measurements and the *average scores* across all criteria resulted in ICC(2,3) 0.866. Raters also consistently agreed on the jury assessment of the applicants *fit* ICC(2,3) 0.816, *collaboration* ICC(2,3) 0.789 and *final jury assessment* ICC(2,3) 0.787. On the level of the other criteria, the measurements were slightly lower; namely, *content* (.561), *context* (.502), *craft* (.657), *creative* (.645), *expertise* (.582), *critique* (.660) *communication* (.685), *contradiction* (.541) and *personality* (.678). These somewhat inconsistent measurements could be in part due the ambiguous comments made during by the jury. For instance, one applicant received the following comment: "beautifully new paintings compared to last year". One rater interpreted this comment as being a positive comment about the artist's *craft* (technique), the other about *creativity* (innovation), and the third about *content* (development) and *creativity*.

<sup>19</sup> We used regressions where we assigned a value 1 rather than 3; this yielded similar results.  
<sup>20</sup> In 8 observations, a final jury assessment score was missing; all these applicants were rejected. We conducted a regression analysis excluding these observations; this yielded similar results.

<sup>18</sup> Intra class correlation coefficient (ICC) is used to measure the consistency or homogeneity of measurements given to the same target by different raters (Shrout and Fleiss, 1979).

#### 2.4.4 Performance measures

According to the RABK mission statement: *RABK aims to develop talent in visual arts. The Academy selects and facilitates exceptional talent and offers selected artists a platform for further development and deepening of the work of art. Exhibition of the work and access to the international network are included in the two-year residency program. For many alumni the internship at RABK has led to their international breakthrough (www.rijksakademie.nl).* We interpret this goal as selection of the best artists from the large pool of applicants, and the facilitative role of RABK in their development to achieve leading positions, i.e., success, in the contemporary art world on an international level. We measure success by two variables: auction sales (from Artnet.com) and reputational rankings based upon exhibition history (from ArtFacts. Net.).

Our first variable of interest is career level sales made at public art auctions. We retrieve this information from Artnet.com, which was founded in 1989. Artnet.com is an art market website that provides detailed information about more than 9 million public art auction results from 1,600 international auction house (Artnet.com annual report, 2014). Our second variable of interest is reputational rankings. We access this information from ArtFacts.Net, which was established in 2001. ArtFacts.Net is a website that ranks contemporary visual artists based upon their annual exhibitions at galleries and museums worldwide. Their aim is “to provide an online structure for art institutions and Internet users, and offer insight into the current state of the contemporary art world” (ArtFacts.Net, 2005). ArtFacts.Net provides reputational rankings for over 100,000 visual artists, based upon annual exhibitions at more than 600,000 galleries, museums and other venues worldwide. Artists are allocated points<sup>21</sup> based on whether or not the exhibition was solo or group at private galleries or public institutions or biennales and other regular exhibitions, and the geographic location, with art centers such as London and New York City receiving more points than Des Moines, Iowa. The artists with the highest number of points are given the lowest rank, e.g., the top ten ranked artists in 2016, in ascending order are: Andy Warhol, Pablo Picasso, Bruce Nauman, Gerhard Richter, Joseph Beuys, Cindy Sherman, John Baldessari, Lawrence Weiner, Sol LeWitt and Ed Ruscha. ArtFacts.Net data has been widely used as a measure of success in management science literature (Ertug, Yogev, Lee, Hedstrom, 2016) and the literature of cultural sociology (Velthuis, 2013; Yogev and Grund, 2012).

### 2.5 AT FIRST GLANCE: THE ADMITTED AND THE REJECTED

#### 2.5.1 Summary Statistics

In Table 2.2, we present basic statistics of our data. Some 43 % of the applicants in our sample have been accepted, almost half are female; sculpture, video and painting take up roughly equal shares; drawing and photography are less frequent. More than half of the applicants invited to the interview round were European: 28% Dutch nationals or have lived in the Netherlands longer than one year and 36% from other Western and Central European countries.

The other 36% of the applicants originate from: North America 7%, South and Central America 8%, India, Asia, and Australia 10% and Africa, and Middle East 11%.

TABLE 2.2 Sample characteristics, all applicants with and without jury notes

	All	Jury notes	No jury notes
Sample size	697	355	342
Percentage accepted	42.90	44.22	41.52
Percentage female	48.20	52.68	43.57
Percentage letter of recommendation	18.94	20.29	17.54
Percentage no previous art education	4.59	3.66	5.55
Discipline:			
Sculpture	27.69	33.52	21.64
Video/film	23.96	27.32	20.47
Painting	28.55	22.82	34.50
Drawing/graphic	8.03	6.76	9.36
Photography	11.76	9.58	14.03
Percentage with 2013 ArtFacts.Net rank	69.01	69.86	68.13
Percentage with 2015 ArtFacts.Net rank	71.30	71.55	71.05
ArtFacts.Net ranking, mean 2013-2015	31776.79	32611.70	30878.37
Percentage with either 2013 or 2015	10.10	11.98	8.06
Percentage with no ArtFacts.Net rank in observation period	26.11	24.78	27.48
Percentage any sales	12.91	12.96	12.86
Mean number of sales if positive	5.59	5.04	6.16
Mean sales price in euros of sales if positive	167552.10	214052.30	118938.30

The results in Table 2.2 suggest that applicants without jury notes are the marginally weaker group. They are accepted at a slightly lower frequency, a smaller share has a letter of recommendation, a larger share does not have formal art school training, and more individuals from this group have not been ranked by ArtFacts.Net compared to the group with jury notes. However, of those that were ranked by ArtFacts.Net in 2013 and 2015, the group without notes has slightly better rankings. Additionally, these applicants - if they had any sales at all - had more sales, although the mean sales price is considerably lower compared to the group with jury notes. We will return to the issue of selective availability of jury notes below.

<sup>21</sup> For a complete explanation of ArtFacts.Net point allocation, see <http://faculty.georgetown.edu/irvinem/visualarts/ArtMarket/ArtFacts.Net-ArtistRanking-Formula-2005.pdf>.

## 2.5.2 Preliminary Analyses

As a first glance about the effectiveness of selective entry, we can consider the performance measures for the accepted applicants and the rejected ones. Figure 2.1 gives the distribution of 2013 and 2015 ArtFacts.Net scores and the distribution of the individual artists' median scores over both years<sup>22</sup>, for accepted (d =1) and rejected (d=0) applicants. The top horizontal lines in Figure 2.1 show the maximum, 3<sup>rd</sup> quartile, median, 1<sup>st</sup> quartile and minimum score, respectively. A dot represents an individual outlier. Accepted applicants perform better, with lower average rank number (i.e. better ranking) and with a shorter lower tail: the bottom performance quartile scores much better ranking positions. Selection appears to cut off the low end of the distribution. A comparison is made between ArtFacts.Net ranking 2013-2015 average scores with and without the outliers, although no real difference in distribution is observed when the outliers are removed. In all boxplot distributions, individuals without Artfacts.Net scores are excluded.

FIGURE 2.1 Boxplot distributions of ArtFacts.Net rankings

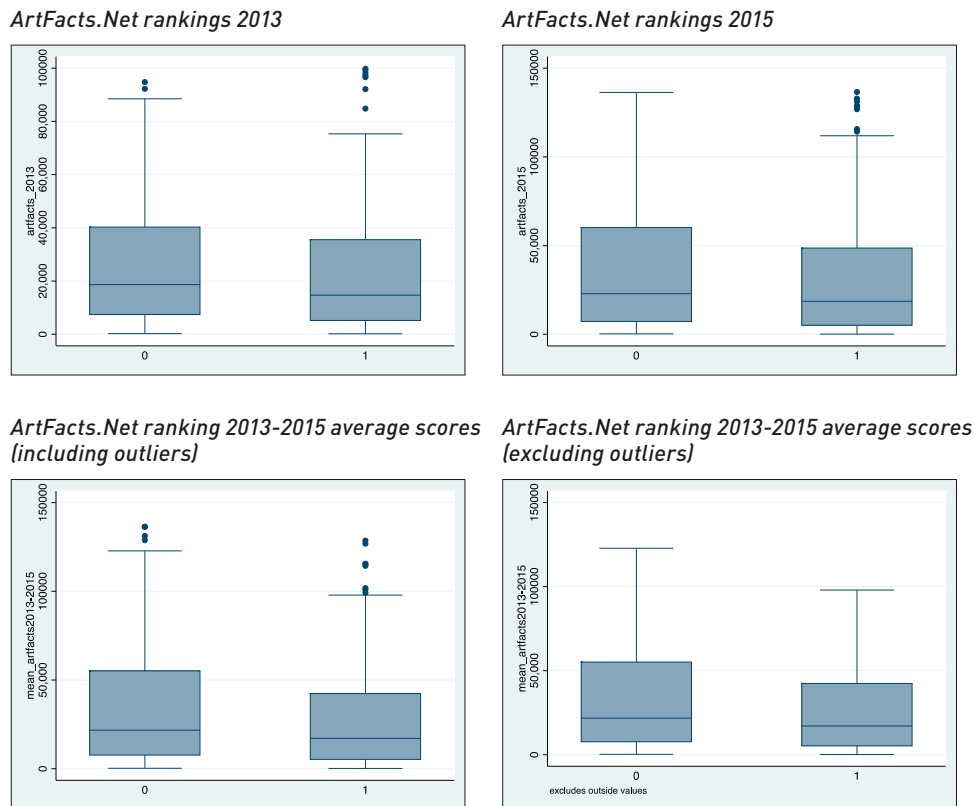
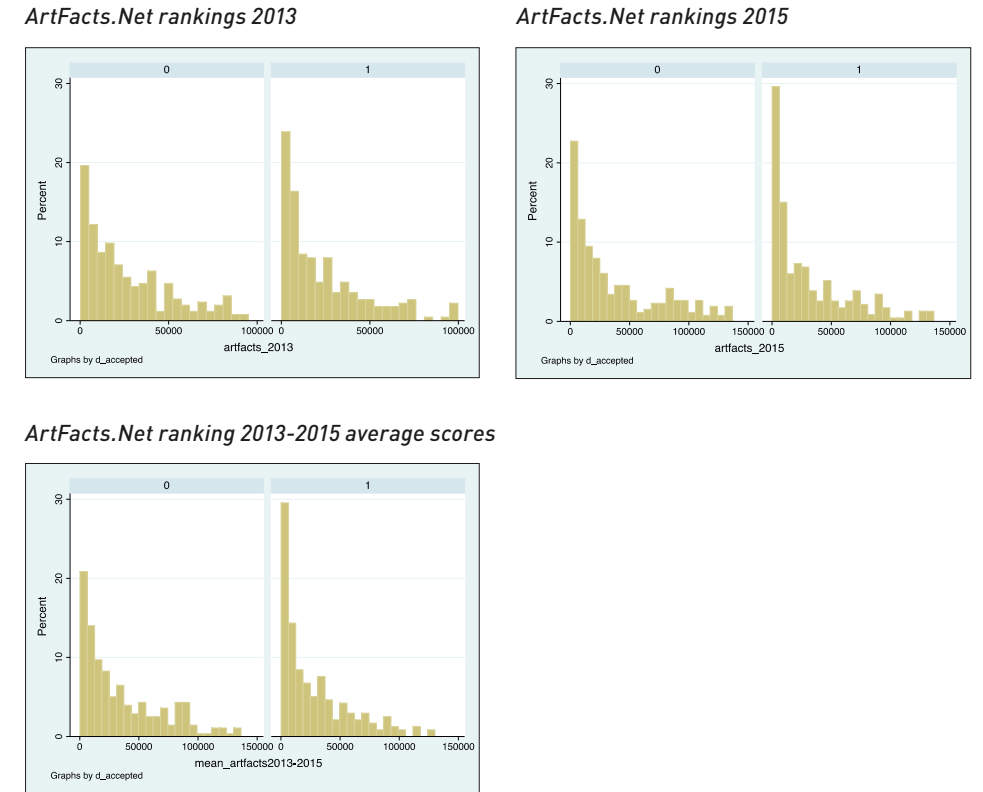


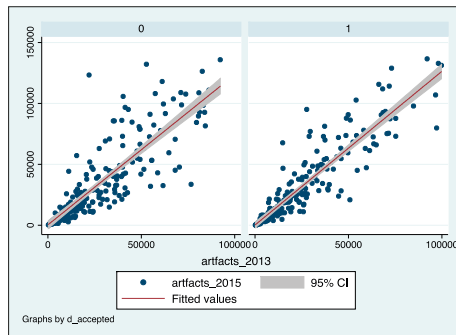
FIGURE 2.2 Histograms of ArtFacts.Net rankings



The histograms in Figure 2.2 confirm that the distributions differ. A formal t-test on the means reveals that 2013 ranking (mean of 23,496.5 for the accepted and 26,798.33 for the rejected, at standard deviations of 23,711.26 and 24,224.91, respectively) is not significantly different from zero at  $p < .05$ .

<sup>22</sup> For those individuals who were ranked in either 2013 or 2015, their average rank is simply the rank they received in that particular year.

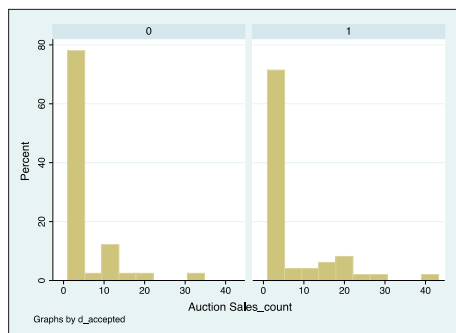
**FIGURE 2.3** Two-way scatter plots for ArtFacts.Net rankings



The 2015 ranking (mean of 31,064.9 for the accepted and 37,420.13 for the rejected, at standard deviations of 33,585.12 and 37,468.61, respectively) is significantly different from zero at  $p < .05$ ; and the average 2013-2015 ranking (mean 28,242.76 for the accepted and 34,789.61 for the rejected, at standard deviations of 29,492.08 and 33,244.62, respectively) is also significantly different from zero at  $p < .05$ .

The two-way scatter plots in Figure 2.3, including the confidence intervals around the predicted values, show a positive linear relationship between rankings in both years for accepted and rejected applicants.

**FIGURE 2.4.1** Distribution of number of artworks sold if positive for accepted (1) and rejected (0) artists.



We have also compared sales performance in Figure 2.4.1. Among the accepted, 49 artists (16.39%) who had any auction sales and among the rejected 41 artists (10.30%). The 49 accepted artists with any sales sold 319 works, the 41 rejected artists who sold any work sold 184 artworks, i.e., if artists sold artworks, the average number of works sold per individual was 6.5 for the accepted and 4.5 for the rejected. The average selling price for the accepted candidate who sold any work was 18,616 euros (SD 130,479 euros) and 23,139 euros (SD 389,885 euros) for the rejected who sold any work at all.

**FIGURE 2.4.2** Distribution of number of works sold (log) if positive for accepted (1) and rejected (0) artists.

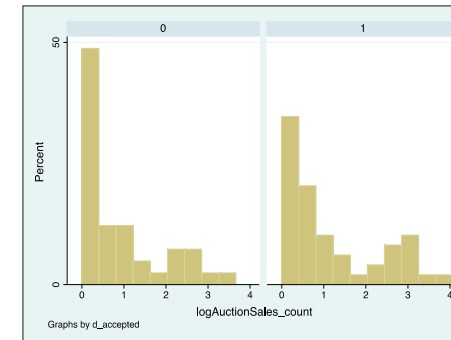
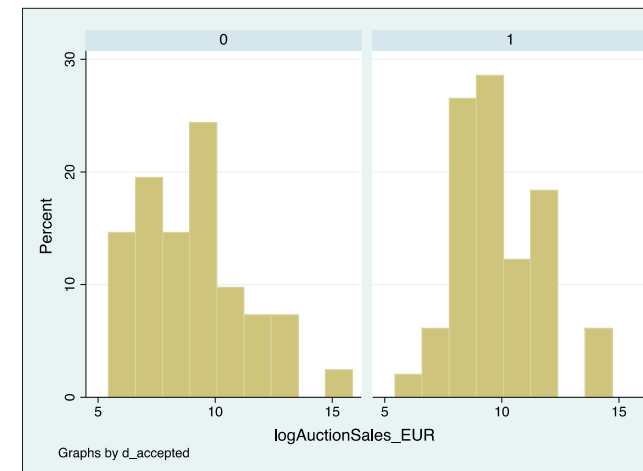


Figure 2.4.2 shows the distributions of number of works sold if positive, for the accepted and the rejected. A formal t-test on the means reveals that the mean sales count (6.510 for the accepted and 4.487 for the rejected, at standard deviations of 8.646 and 6.395, respectively) are not significantly different from zero at  $p < .05$ ; and the mean sales amount in euros (113,598.30 for the accepted and 232,033.50 for the rejected, at standard deviations of 43957.53 and 188,779.20, respectively) are not significantly different from zero at  $p < .05$ . Additionally, we conducted a chi-square test of independence to test for equality of proportions between the accepted and rejected applicants and the number of sales at auctions; we found that the proportions are not significantly different from each other at  $p < .05$ .

**FIGURE 2.4.3** Distribution of sales price (log) of works sold if positive for accepted (1) and rejected (0) artists.





**TABLE 2.3<sup>23</sup>: Residuals and probability of acceptance (probit)**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
res_l-2013	-0.083** (0.034)						0.069 (0.166)
dartf-2013	-0.913* (0.527)						1.217 (1.668)
res_logA-5		-0.085** (0.028)					-0.157 (0.146)
dartf-2015		-0.904** (0.435)					-1.712 (1.376)
r-20132015			-0.027** (0.007)				0.031 (0.234)
d_2015_13			-0.496** (0.192)				-0.085 (1.707)
d_no_rank				-0.311** (0.111)			0.000 (.)
res_logA-R					0.035** (0.015)		0.001 (0.022)
res_Auct-t						0.032** (0.015)	0.017 (0.021)
N	697	697	697	697	697	697	697
pseudo R2	0.018	0.022	0.019	0.008	0.006	0.005	0.027

Standard errors in parentheses

\* p<0.10, \*\* p<0.05

In Table 2.3 we consider the probability of acceptance in relation to performance measures, ignoring the reverse effect that a residency at the RABK may have on later performance (see Appendix C for description of variable names). If we assume that performance is exogenous in this respect, that selection aims to admit the “better” artists and that the quality the jury aims for is reflected in our performance measures, regression of admittance on performance would reveal the success of the jury decisions.

As older cohorts of applicants have had more time to realize their potential, we control for “career age” by measuring performance as the residual from a regression on career age and its square. The results in Table 2.3 indicate that realized future success, i.e., a lower ArtFacts.Net ranking or higher sales made at auction (count and euro amount) has a significant effect on probability of admission.

<sup>23</sup> We created two dummy variables indicating if an individual had an ArtFacts.Net ranking in 2013 or in 2015. If that was true then a value of one was assigned, otherwise a value of zero was given. We also made a dummy variable indicating if an artist was not ranked in 2013 or 2015 then a value of one was given, otherwise zero.

When all variables are included in model 6, the separate effects are diluted to insignificance. For those artists who received an ArtFacts.Net rank in 2013 and/or 2015, the correlation between the residuals of the variables ArtFacts.Net rank 2013 and ArtFacts.Net rank 2015 is  $r=0.84$  and the correlation between the residuals of sales count and sales price is  $r=0.69$ . We may conclude that artists who turn out to perform better had a greater chance of having been being admitted to the RABK.

This preliminary analysis indicates differences between accepted and rejected applicants, but the differences are not always statistically significant. The probability of admittance appears to have been higher for artists who later secure higher reputation ranking and who sell more artworks, either as number of sales or price paid. Conversely, accepted artists have higher mean ranking than rejected artists, but this difference is not statistically significant in 2013. More often they have any positive sales but they realize a lower selling price. They sell more works, but the difference is not statistically significant. Visually, selection appears to cut off the bottom tail of the ranking distribution; by consequence, the ranking distribution of the accepted has smaller standard deviation than the distribution of the rejected.

## 2.6 SELECTION AND THE IMPACT ON PERFORMANCE

### 2.6.1 Interview notes and selectivity

To analyze the admission decision, we will use the two types of explanatory variables, the biographic data and the jury data, consisting of the scores on 11 multiple selection criteria and the final jury assessment. We make this distinction, as we are particularly interested in the effectiveness of the jury assessments. As we do not have jury notes for each applicant, we will first consider if availability of notes is selective rather than random. In a probit regression of having jury notes we do not find an effect on the acceptance decision nor any of the performance measures. Table 2.4 we show results when we add the biographic controls. This tells the same story: having jury notes or not having notes is not related to the acceptance decision or to performance measures. There are, however, differences among disciplines (higher probability for video and sculpture) and by gender: a higher probability of notes for women. We have no explanation for these findings<sup>24</sup>. These results confirm that the availability of jury notes is random, and therefore, have no effect on selectivity in relation to individual quality or qualification.

<sup>24</sup> Gender composition of the jury: Of the 30 individuals who served as jurors on the selection committee(s), 40% were women (n=12), and 60% were men (n=18).

**TABLE 2.4** Probability of interview notes related to performance (probit)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
d_accepted	-0.077 (0.127)							-0.071 (0.130)
d_ref_le-r	-0.119 (0.163)	-0.119 (0.163)	-0.120 (0.163)	-0.125 (0.163)	-0.123 (0.163)	-0.128 (0.163)	-0.125 (0.163)	-0.110 (0.164)
d_autodi-s	-0.047 (0.302)	-0.065 (0.303)	-0.067 (0.303)	-0.052 (0.305)	-0.053 (0.302)	-0.055 (0.302)	-0.054 (0.302)	-0.105 (0.314)
d_sculpt-n	0.905** (0.168)	0.881** (0.168)	0.893** (0.168)	0.892** (0.168)	0.900** (0.168)	0.892** (0.169)	0.894** (0.168)	0.892** (0.172)
d_videof-m	0.869** (0.183)	0.833** (0.184)	0.843** (0.184)	0.853** (0.182)	0.859** (0.182)	0.849** (0.184)	0.856** (0.182)	0.839** (0.190)
d_female	0.288** (0.125)	0.301** (0.126)	0.294** (0.126)	0.294** (0.126)	0.293** (0.126)	0.289** (0.125)	0.293** (0.125)	0.302** (0.127)
d_nation-y	-0.155 (0.145)	-0.134 (0.147)	-0.158 (0.146)	-0.151 (0.146)	-0.160 (0.144)	-0.166 (0.145)	-0.155 (0.146)	-0.124 (0.148)
age_inte-w	-0.098 (0.115)	-0.113 (0.122)	-0.101 (0.118)	-0.106 (0.120)	-0.101 (0.117)	-0.099 (0.117)	-0.104 (0.119)	-0.110 (0.123)
age_2	0.002 (0.002)	0.002 (0.002)	0.002 (0.002)	0.002 (0.002)	0.002 (0.002)	0.002 (0.002)	0.002 (0.002)	0.002 (0.002)
d2x_inte-w	0.144 (0.204)	0.139 (0.203)	0.150 (0.203)	0.144 (0.204)	0.153 (0.203)	0.149 (0.203)	0.147 (0.203)	0.146 (0.207)
d_drawin-s	0.310 (0.240)	0.291 (0.240)	0.294 (0.240)	0.303 (0.240)	0.308 (0.241)	0.296 (0.241)	0.305 (0.239)	0.282 (0.246)
d_photog-y	0.013 (0.219)	-0.018 (0.221)	-0.001 (0.220)	0.002 (0.220)	0.009 (0.219)	0.000 (0.220)	0.006 (0.219)	-0.056 (0.225)
res_l-2013		-0.047 (0.060)						-0.193 (0.217)
dartf-2013		-0.619 (0.937)						-2.755 (2.308)
res_logA-5			-0.026 (0.051)					0.174 (0.265)
dartf-2015			-0.411 (0.791)					1.809 (1.989)
r-20132015				-0.004 (0.009)				-0.045 (0.385)
d_2015_13				-0.021 (0.241)				-0.204 (2.821)
res_logA-R					0.004 (0.019)			0.009 (0.028)
res_Auct-t						-0.005 (0.019)		-0.015 (0.027)
d_no_rank							-0.046 (0.140)	0.000 (.)
N	697	697	697	697	697	697	697	697
Cohort yr effects	yes	yes	yes	yes	yes	yes	yes	yes
pseudo R2	0.429	0.429	0.429	0.428	0.428	0.428	0.428	0.434

Standard errors in parentheses

\* p<0.10, \*\* p<0.05

In the preliminary analysis we also conducted a principle components analysis (see Appendix F) but we were unable to give meaningful interpretations to the groupings. In fact, the correlations among the criteria are rather low, with two sets of variables content and creativity and context and communication having the highest correlations at  $r = 0.26$  and  $r = 0.22$ , respectively. As reduction of dimensionality is attractive, we did aggregate variables into three groups, based on similarity or closeness of the criteria, in our own reading of the definitions:

Group name	Selection criteria
(1) Art quality	Craft and creativity
(2) RABK goals	Fit, context, critique
(3) Individual quality	Personality, contradiction, collaboration, communication, personality, expertise

The rationale to organize the multiple selection criteria into these specific sub-groups is as follows: If the jury process works as the RABK intends, to find promising artists that fit the RABK setting and will benefit most, group (2) should have a substantial weight in the admission decision. It may also be that the jury, as many juries do, simply focuses on perceived quality. In that case, group (1) should dominate the decision. If group (3) dominates, it's just the impression that an artist makes on the jury: nice person, good communication, sells him/herself well.

### 2.6.2 Multiple selection criteria

In Table 2.5, we analyze the acceptance decision with a probit regression. We start with biographic data only and then add data from the jury assessment in several steps. With only biographic data, on the full sample, pseudo  $R^2$  is low. Dutch applicants and video artists have a higher probability of admission in the full sample. As we can only analyze the effects of the jury assessment if we have jury notes, we repeat this analysis for the subsample with notes. Now, in addition, sculpture artists are also significantly more often admitted, a letter of reference has a significant positive effect and having an interview history is strongly negative. The dummy for the years with a different jury procedure (1995-1998) is only significant when we add the individual selection criteria and the groupings; along with this control variable, we have also included cohort year effects.

In model 3 we add the variables for the individual criteria, and we see that four of them have a significant positive effect. Ranked by size of the coefficient, they are: collaboration, creativity, fit and content. This is a deviation from the weights of the criteria on the final assessment. If, instead of the separate criteria, we use the final assessment, the pseudo  $R^2$  increases. Model 6 shows that significance of a criterion in the linear specification does not always point to a situation where successive scores per criterion have monotonic effect on the admission decision.<sup>25</sup> This is reiterated in a specification (not reported) where we changed the reference level of the jury criteria, now with the lowest level as base, rather than the middle level.

<sup>25</sup> We have considered if criteria with larger variance of scores among individuals (indicating more perceived heterogeneity) are better predictors of admission. This is not the case; there is no relation between score variance and t value of criteria (see Appendix D).

Creativity has its significant effect mostly because of a positive effect for scoring above average, while personality and fit has a negative effect when scoring below average. When we add the three groups in model 7, the pseudo R<sup>2</sup> is lower than when we only include the residual for final assessment. In this specification, artistic quality has the strongest positive effect, followed by fit with the RABK goals; personality has no significant effect.

We conclude that among the biographic data, nationality and a reference letter have a significant positive effect on the admission decision and that video artists have a greater likelihood of admission than artists from other disciplines, while repeated participation in the jury process has a strong negative effect. Among the separate jury criteria, significant monotonic effects are not the rule. Scoring above average on creativity has a clear positive effect, scoring below average on personality and fit has a clear negative effect. The final jury assessment, combining much information collected in the jury process, on its own has a strong effect on the admission decision. Averaging the jury assessment into three variables shows that artistic quality and fit to the RABK goals have significant effect on the admission decision, while personality does not.

**TABLE 2.5** Probability of acceptance (probit)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
age_inte~w	-0.048 (0.064)	-0.007 (0.083)	0.024 (0.104)	-0.043 (0.088)	-0.024 (0.122)	-0.021 (0.120)	0.040 (0.097)
age_2	0.000 (0.001)	0.000 (0.001)	-0.000 (0.002)	0.001 (0.001)	0.000 (0.002)	0.000 (0.001)	-0.001 (0.001)
d_female	-0.119 (0.100)	-0.089 (0.141)	-0.098 (0.152)	-0.215 (0.156)	-0.192 (0.172)	-0.200 (0.177)	-0.102 (0.148)
d_nation~y	0.197* (0.111)	0.300* (0.167)	0.378** (0.183)	0.593** (0.186)	0.756** (0.214)	0.789* (0.227)	0.393** (0.178)
d_autodi~s	0.179 (0.238)	0.093 (0.376)	0.344 (0.441)	0.360 (0.388)	0.671 (0.466)	0.866 (0.491)	0.431 (0.425)
d_ref_le~r	0.097 (0.128)	0.336* (0.182)	0.322* (0.195)	0.358* (0.198)	0.374* (0.220)	0.442* (0.230)	0.347* (0.190)
d2x_inte~w	-0.208 (0.160)	-0.637** (0.252)	-0.664** (0.283)	-0.986** (0.277)	-1.142** (0.321)	-1.23** (0.337)	-0.630** (0.272)
d_sculpt~n	0.202 (0.134)	0.344* (0.205)	0.378* (0.221)	0.315 (0.223)	0.369 (0.248)	0.460* (0.260)	0.314 (0.213)
d_videof~m	0.447** (0.140)	0.421** (0.205)	0.462** (0.223)	0.389* (0.224)	0.500** (0.251)	0.591* (0.269)	0.435** (0.215)
d_drawin~s	0.182 (0.196)	-0.117 (0.320)	-0.319 (0.349)	-0.022 (0.336)	-0.201 (0.379)	-0.221 (0.395)	-0.296 (0.335)
d_photog~y	0.187 (0.172)	0.293 (0.276)	0.362 (0.297)	0.269 (0.305)	0.355 (0.336)	0.286 (0.347)	0.383 (0.285)
d_jur~1998	0.262 (0.222)	0.361 (0.313)	0.686* (0.352)	0.005 (0.351)	0.378 (0.421)	0.271 (0.431)	0.655* (0.341)
<b>CONTENT</b>			0.207** (0.096)	0.212** (0.106)			
low score						-0.461 (0.285)	
high score						-0.026 (0.321)	
<b>CONTEXT</b>			0.018 (0.137)	-0.022 (0.152)			
low score						0.042 (0.211)	
high score						-0.094 (0.398)	

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
<b>CRAFT</b>			0.145 (0.114)		0.171 (0.128)		
low score						-0.067 (0.231)	
high score						0.382 (0.280)	
<b>CREATIVITY</b>			0.444** (0.100)		0.553** (0.113)		
low score						-0.180 (0.311)	
high score						1.033** (0.335)	
<b>EXPERTISE</b>			-0.120 (0.171)		-0.222 (0.190)		
low score						0.034 (0.233)	
high score						-0.984* (0.523)	
<b>CRITIQUE</b>			0.192 (0.154)		0.239 (0.171)		
low score						-0.227 (0.232)	
high score						0.426 (0.396)	
<b>COMMUNICATION</b>			-0.050 (0.125)		-0.054 (0.139)		
low score						0.128 (0.221)	
high score						0.041 (0.340)	
<b>FIT</b>			0.415** (0.117)		0.451** (0.133)		
low score						-0.577* (0.223)	
high score						0.305 (0.282)	
<b>COLLABORATION</b>			0.545** (0.244)		0.622** (0.273)		
low score						-0.717* (0.391)	
high score						0.678 (0.483)	
<b>CONTRADICTION</b>			-0.034 (0.079)		-0.050 (0.089)		
low score						0.190 (0.189)	
high score						omitted	
<b>PERSONALITY</b>			0.192 (0.137)		0.207 (0.145)		
low score						-0.663** (0.250)	
high score						-0.221 (0.263)	
resFINAL				0.807** (0.094)	0.868** (0.100)		0.877** (0.095)
Art quality							0.768** (0.149)
RABK Goals							0.681** (0.214)
Individual quality							0.075 (0.254)
N	697	355	355	355	355	355	355
Cohort yr effect	yes	yes	yes	yes	yes	yes	yes
pseudo R2	0.034	0.063	0.187	0.319	0.371	0.393	0.153

Standard errors in parentheses  
\* p<0.10, \*\* p<0.05

### 2.6.3 Switching regressions

We estimate switching regressions, also known as the Roy model, to measure the performance of the accepted and rejected applicants. Switching regressions are similar to two-step selection models (Heckman 1974, 1976), i.e., to get consistent estimates, the mean zero restriction on the error term, conditional on the explanatory variables, is restored by including an estimate of the selection bias. This means that these models are efficient as long as the functional relationship between the outcome equation and the selection equation are correctly specified.

We first estimate the parametric two-step selection models, which include an outcome equation and a selection equation for two distinct performance outcomes: sales at public auctions and reputational ranking. For sales, we have complete records: any artist who ever sells anything in an auction is recorded. We transformed amount of sales in euros to the natural log, adding 1 euro if sales were zero. The range of sales in euros expressed in natural log is: 15.86 (for the best performer) and 5.44 (for the worst); we observe  $n=355$  for both performance and selection equations for accepted and rejected. For reputational rankings, measured by ArtFacts.Net, we took the mean of 2013 and 2015 rankings if both positive, or one year ranking if only one positive; otherwise we assigned those individuals who were not scored in either 2013 or 2015 a score of 25 (log), which is an artificially high score, roughly  $10^{11}$ . The range of ArtFacts.Net scores expressed in natural log is: 5.01 (for the best performer) and 11.82 (for the worst); again, we observe  $n=355$  for both performance and selection equations for accepted and rejected. We also include a dummy variable coded 1 if the artist has never been ranked, otherwise 0.

In the outcome equation, we estimate the relationship between both performance outcomes and the explanatory variables, i.e., biographic data and multiple selection criteria. We also specify the variable career age, which is measured as 2015 minus year applied. We include this variable to control for tenure, i.e., artists with longer careers had opportunities to sell more artworks and participate in more exhibitions compared to artists with shorter career trajectories. In the selection equation, we estimate the binary decision of acceptance and rejection, using the same explanatory variables as in this first equation. However, in this equation we also include two instruments as variables to enhance identification of these models. The first instrument is a set of dummy variables indicating artists' origin based on geographic region.<sup>26</sup> We include these variables because RABK explicitly selects some applicants from under represented geographical regions.<sup>27</sup> The second instrument is a dummy variable indicating if the applicant is Dutch, coded as 1, otherwise 0. We make this distinction because RABK categorizes artists living in the Netherlands for at least one year, regardless of their citizenship, as being Dutch. In the selection equation we do not include the variable career age or the variable measuring no Artfacts.Net rank, as these two variables do not have an effect on selection.

Similar to parametric two-step selection models, semi-parametric selection models consist of performance and selection equations, where the functional relationships between the two are specified.

<sup>26</sup> Nation\_1 represents Europe, Nation\_2 represent North America, Nation\_3 represents South America, Mexico and the Caribbean, Nation\_4 represents Asia, and Nation\_5 represents Africa and Middle East (base).

<sup>27</sup> This information was provided during an interview with the RABK director in 2009.

We estimated Newey (1999) semi-parametric selection models with polynomial approximations of orders 2, 3 and 4. The estimation results from both the parametric and semi-parametric two-step selection models are quite similar; with the polynomial approximation of order 4, in the semi-parametric selection models, indicating selectivity with respect to the accepted candidates but not to the rejected ones, similar to our results in the parametric estimations. This result leads us to conclude that the assumption of normality made in the parametric selection models is not too restrictive. Because of the similarity in our results, we will continue reporting results from the parametric two-step selection models. (Results from the semi-parametric selection models available upon request)

TABLE 2.6.1 Explaining reputational rankings by selection criteria

	<i>(accepted)</i>	<i>(rejected)</i>		<i>(accepted)</i>	<i>(rejected)</i>		<i>(accepted)</i>	<i>(rejected)</i>
<b>Outcome equation</b>			<b>Selection equation</b>					
career_age	0.035	0.017	ave_crit-i	0.228	-0.002	d_painting	0.305	0.305
	(0.040)	(0.033)		(0.201)	(0.190)		(0.336)	(0.336)
d_1age_i-w	-0.283	-0.263	ave_comm-i	0.147	-0.111	d_drawin-s	-0.459	0.459
	(0.273)	(0.257)		(0.156)	(0.152)		(0.417)	(0.417)
d_2age_i-w	-0.466*	-0.071	ave_fit_i	-0.329*	-0.264	d_jur-1998	-0.210	0.210
	(0.257)	(0.230)		(0.180)	(0.176)		(0.259)	(0.259)
d_female	0.049	0.317*	ave_coll-i	-0.184	0.108	ave_c-nt_i	0.227**	-0.227**
	(0.203)	(0.189)		(0.315)	(0.318)		(0.104)	(0.104)
d_autodi-s	0.197	-1.328**	av-ction_i	-0.104	0.075	ave_c-xt_i	-0.032	0.032
	(0.564)	(0.527)		(0.105)	(0.096)		(0.152)	(0.152)
d_ref_le-r	-0.039	0.044	ave_pers-i	-0.077	-0.268	ave_craf-i	0.141	-0.141
	(0.248)	(0.247)		(0.186)	(0.167)		(0.126)	(0.126)
d2x_inte-w	0.408	0.786**	res_Final	-0.541**	-0.695**	ave_crea-i	0.535**	-0.535**
	(0.475)	(0.347)		(0.237)	(0.225)		(0.105)	(0.105)
d_2015_13	0.137	1.206**	<b>Selection equation</b>			ave_expe-i	-0.137	0.137
	(0.389)	(0.274)	d_nation-y	0.715**	-0.715**		(0.182)	(0.182)
d_no_rank	15.058**	15.227**	Nation_1	-0.142	0.142	ave_crit-i	0.361**	-0.361**
	(0.250)	(0.191)		(0.298)	(0.298)		(0.171)	(0.171)
d_no_sale	1.695**	0.802**	Nation_2	0.085	-0.085	ave_comm-i	-0.048	0.048
	(0.277)	(0.266)		(0.376)	(0.376)		(0.136)	(0.136)
d_sculpt-n	-0.105	0.050	Nation_3	-0.664*	0.664*	ave_fit_i	0.431**	-0.431**
	(0.367)	(0.353)		(0.379)	(0.379)		(0.131)	(0.131)
d_videof-m	-0.417	0.168	Nation_4	-0.265	0.265	ave_coll-i	0.640**	-0.640**
	(0.363)	(0.357)		(0.357)	(0.357)		(0.276)	(0.276)
d_painting	0.915**	0.815**	d_1age_i-w	-0.080	0.080	av-ction_i	-0.055	0.055
	(0.405)	(0.362)		(0.239)	(0.239)		(0.086)	(0.086)
d_drawin-s	0.123	0.044	d_2age_i-w	-0.149	0.149	ave_pers-i	0.226	-0.226
	(0.572)	(0.450)		(0.212)	(0.212)		(0.145)	(0.145)
d_jur-1998	0.400	0.332	d_female	-0.208	0.208	Res_Final	0.840**	-0.840**
	(0.367)	(0.347)		(0.168)	(0.168)		(0.096)	(0.096)
ave_c-nt_i	-0.141	-0.293**	d_autodi-s	0.724	-0.724	N	355	355
	(0.134)	(0.130)		(0.459)	(0.459)	Mills ratio		
ave_c-xt_i	-0.045	0.133	d_ref_le-r	0.266	-0.266	Lambda	-0.923*	1.331**
	(0.169)	(0.171)		(0.211)	(0.211)	Rho	-0.742	0.982
ave_craf-i	-0.113	0.013	d2x_inte-w	-1.261**	1.261**	Sigma	1.243	1.354
	(0.146)	(0.144)		(0.331)	(0.331)			
ave_crea-i	-0.237	-0.191	d_sculpt-n	0.057	-0.057	Standard errors in parentheses		
	(0.173)	(0.179)		(0.324)	(0.324)	* p<0.10, ** p<0.05		
ave_expe-i	0.052	0.020	d_videof-m	0.172	-0.172			
	(0.211)	(0.200)		(0.330)	(0.330)			

TABLE 2.6.2 Explaining sales at art auctions by selection criteria

	(accepted)	(rejected)	(accepted)	(rejected)	(accepted)	(rejected)			
<b>Outcome equation</b>									
career_age	-0.025 (0.020)	0.040 (0.025)	ave_coll-i	0.122 (0.157)	0.363* (0.219)	ave_crea-i	0.535** (0.105)	-0.535** (0.105)	
d_1age_i-w	-0.145 (0.137)	-0.030 (0.177)	av-ction_i	-0.029 (0.052)	-0.010 (0.066)	ave_expe-i	0.137 (0.182)	0.137 (0.182)	
d_2age_i-w	-0.126 (0.129)	0.034 (0.157)	ave_pers-i	0.133 (0.093)	0.066 (0.115)	ave_crit-i	0.361** (0.171)	-0.361** (0.171)	
d_female	-0.250** (0.101)	-0.029 (0.130)	res_Final	0.162 (0.119)	0.183 (0.159)	ave_comm-i	0.048 (0.136)	0.048 (0.136)	
d_autodi-s	-0.429 (0.282)	-0.103 (0.365)	<b>Selection equation</b>				ave_fit_i	0.431** (0.131)	-0.431** (0.131)
d_ref_le-r	-0.140 (0.124)	0.107 (0.172)	d_nation-y	0.715** (0.234)	-0.715** (0.234)	ave_coll-i	0.640** (0.276)	-0.640** (0.276)	
d2x_inte-w	-0.174 (0.239)	-0.111 (0.235)	Nation_1	-0.142 (0.298)	0.142 (0.298)	av-ction_i	-0.055 (0.086)	0.055 (0.086)	
d_2015_13	-0.003 (0.197)	-0.077 (0.211)	Nation_2	0.085 (0.376)	-0.085 (0.376)	ave_pers-i	0.226 (0.145)	-0.226 (0.145)	
d_no_rank	0.034 (0.128)	-0.082 (0.146)	Nation_3	-0.664* (0.379)	0.664* (0.379)	Res_Final	0.840** (0.096)	-0.840** (0.096)	
d_no_sale	-9.751** (0.141)	-8.901** (0.203)	Nation_4	-0.265 (0.357)	0.265 (0.357)	N	355	355	
d_sculpt-n	0.034 (0.184)	0.065 (0.244)	d_1age_i-w	-0.080 (0.239)	0.080 (0.239)	Mills ratio			
d_videof-m	-0.003 (0.181)	-0.105 (0.247)	d_2age_i-w	-0.149 (0.212)	0.149 (0.212)	Lambda	0.387	-0.395	
d_painting	0.039 (0.203)	0.268 (0.247)	d_female	-0.208 (0.168)	0.208 (0.168)	Rho	0.635	-0.463	
d_drawin-s	0.082 (0.288)	-0.070 (0.305)	d_autodi-s	0.724 (0.459)	-0.724 (0.459)	Sigma	0.609	0.853	
d_jur-1998	0.298 (0.185)	-0.158 (0.247)	d_ref_le-r	0.266 (0.211)	-0.266 (0.211)	Standard errors in parentheses * p<0.10, ** p<0.05			
ave_c-nt_i	0.012 (0.067)	0.072 (0.090)	d2x_inte-w	-1.261** (0.331)	1.261** (0.331)				
ave_c-xt_i	0.075 (0.084)	-0.104 (0.118)	d_sculpt-n	0.057 (0.324)	-0.057 (0.324)				
ave_craf-i	0.010 (0.073)	-0.003 (0.099)	d_videof-m	0.172 (0.330)	-0.172 (0.330)				
ave_crea-i	0.188** (0.087)	0.209 (0.128)	d_painting	-0.305 (0.336)	0.305 (0.336)				
ave_expe-i	-0.022 (0.105)	-0.148 (0.138)	d_drawin-s	-0.459 (0.417)	0.459 (0.417)				
ave_crit-i	-0.052 (0.100)	-0.043 (0.131)	d_jur-1998	-0.210 (0.259)	0.210 (0.259)				
ave_comm-i	0.065 (0.078)	0.066 (0.105)	ave_c-nt_i	0.227** (0.104)	-0.227** (0.104)				
ave_fit_i	0.078 (0.090)	0.226* (0.123)	ave_c-xt_i	-0.032 (0.152)	0.032 (0.152)				
			ave_craf-i	0.141 (0.126)	-0.141 (0.126)				

In our sample we have 355 observations: 157 accepted and 198 rejected applicants. As the selection equation shows, we find that Dutch applicants have higher probability of admission, and being interviewed a second time has a negative effect. There are no differences in the probability of admission among the five disciplines. Our results show that six criteria have statistically significant effects on admission, very much in line with the results reported in Table 2.5. Criteria concerned with creative and technical processes, i.e., content and creativity, receiving a high score on individual characteristics, i.e., ability to handle critique and jury member(s) wanting to professionally collaborate with the applicant, and scoring well on the fit with RABK goals criteria and the jury's final assessment are significant predictors of acceptance. In contrast with Table 2.5, we now have measured Final assessment as a residual after a regression on the 11 separate criteria. The final assessment emerges in the final jury meeting, and obviously reflects the assessments on the separate criteria. By taking the residual we use the additional information that has not already been accounted for in the separate criteria. In this simultaneous modeling of admission and performance, the letter of reference no longer has significant effect on the admission decision.

The selection equation does not support the stated prior weights of the criteria on the final decision. As Appendix A indicates, content should be the most important variable, followed by 4 equally weighted criteria (context, critique, communication and fit), next creativity and then craft and expertise. In the actual decision, collaboration and creativity have the highest weights and are statistically significant, with critique and fit in second place. Content, supposed to have the highest weight takes only third place. Clearly the jury is not doing what it thought it was doing, which is no doubt a consequence of the unstructured nature of the selection process. The conclusion is supported by the large and highly significant effect of the residual final assessment: apparently, factors not accounted for in the weighted criteria schedule have a strong influence<sup>28</sup>.

In Table 2.6.1 we use ArtFacts.Net rankings as a measure of performance, which is the mean of the 2013 and 2015 rankings if both positive, or one year ranking if only one positive. First, in the outcome equation for the accepted applicants, our results show that receiving a high score on the fit with RABK goals criteria and the jury's final assessment are strong predictors of artists having lower (better) reputational rankings. In the outcome function for rejected applicants, content and the final jury assessment are strong predictors of lower (better) ArtFacts.Net scores. We also find that being interviewed twice (or more) in different years predicts a higher (worse) ArtFacts.Net score for the rejected, while this effect is not statistically significant for the accepted applicants. Painters, from both the accepted and rejected categories, have higher (worse) reputational rankings.

<sup>28</sup> With the three aggregate variables in the selection equation, the residual and art are highly significant at roughly equal weights; fit with RABK goals has slightly lower weight, personality is not significant.

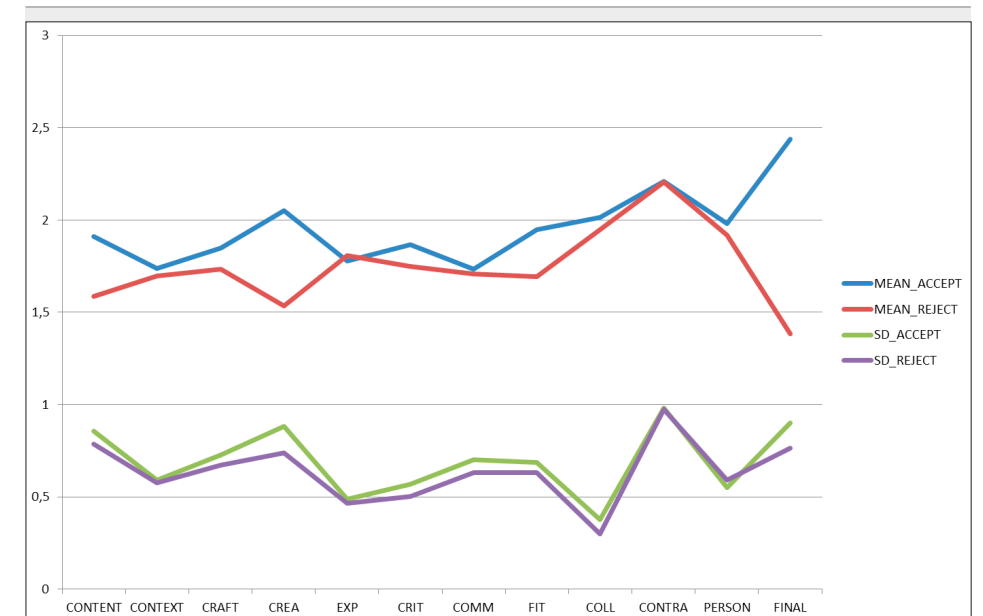
In Table 2.6.2 we measure performance by taking the log value of cumulative career sales at public auctions. With the same selection equation as before, the selectivity correction is not significant. Many of the significant variables for accepted applicants in the performance equation for reputational rankings are also significant for the accepted in the sales equation; however, these results should be interpreted with caution, as only 90 artists have non-zero sales value. Our results show that receiving a high score on criteria concerned with creative processes, i.e., a high score on the creativity criterion, predict higher sales for accepted applicants. Receiving a high score on final assessment has no effect on sales performance. In the outcome function for rejected applicants, only fit and collaboration criteria have a significant and positive effect on sales. We find that being interviewed twice (or more) in different years no effect on the performance outcome of the accepted and rejected applicants.

Formal statistical testing indicates that the performance or outcome equations for the accepted and the rejected applicants are not significantly different. We tested equality of all regression coefficients simultaneously, both including and excluding the intercepts and could not reject equality. We also tested coefficients separately, maintaining the other coefficients at their values estimated for accepted and rejected. Only two coefficients differ significantly (at 10%) for the ranking performance (communication and expertise), no difference is significant for auction sales.

The equality of the performance equations for the accepted and the rejected is a highly relevant finding of our analysis. This points to a situation where there is only one “production function” for success. All the jury can do is selection of applicants on the basis of the inputs, the variables “producing” the performance: pick the applicants with the highest values of the predictors (properly weighted). One could also imagine the situation where the production function is different in the RABK, as a more effective producer of output (performance) from given inputs. This, after all, is the goal of the RABK residency program; help promising artist to develop their talent and, presumably, to become a successful artist. If their qualifications, as measured by their criteria scores, mature in the outside world just as well as in the RABK residency, the program does not add anything, except what is going on through the selectivity correction: the qualifications that we do not observe. Indeed, the Mills ratio or lambda is significant for both the accepted and the rejected in the case of rankings, and not significant for the accepted and the rejected in the case of sales. Accepted artists have unobserved qualities that lead to higher rankings, and rejected artists have unobserved qualities that lead to lower rankings. This can be taken as a credit for the selection process: the jury recognizes more than we can observe. Of course we should not forget that our entire analysis is based on the sample of artists who passed all the initial selections: our findings only relate to those artists that have made it to the final round. One can easily anticipate substantially different results for the entire sample of applicants.

With minor and statistically insignificant differences in performance equations, the major difference among the accepted and the rejected is the difference in qualifications at entry, as a consequence of selection. Figure 2.5 indicates that the accepted score higher on all jury criteria. Most differences are modest, the highest values obtain for creativity and residual final assessment. Standard deviations are very close for the accepted and the rejected.

FIGURE 2.5 Scores on selection criteria for accepted and rejected applicants (means, standard deviations)



## 2.7 ROBUSTNESS TESTS

We conducted a number of robustness checks (available upon request). In our previous analysis, we used switching regressions based on parametric two-step selection regressions (Table 2.6.1 and Table 2.6.2), in which we assigned individuals who were not ranked by Artfacts.Net in either 2013 or 2015 a score of 25 (log), where the best score was the 5.01 (log) and the worst 11.82 (log). In the first robustness test, we use similar parametric selection specifications, however, we impute 15 (log) instead 25(log) for unranked artists. As earlier, we include a dummy variable coded 1 if an artist has never been ranked, and otherwise 0. These results are robust to our original specifications. In the second robustness test, we kept the unranked artists at 15(log) but included the three aggregate variables called: artistic quality, fit to the RABK goals and personality. These results are also similar to our previous findings.

In the third robustness check, we estimate two regressions for non-linear distributions of count dependent variables: Poisson and probit. In the Poisson regression we use the count of auction sales as the dependent variable, and in the probit regression positive career sales are coded as 1, no career sale zero. The results from both the poisson and probit regressions are comparable to the results from the performance equation for auction sales in our parametric selection models.

Lastly, we used three new operationalizations of our selection criteria variables. We apply these three alternatives variables in switching regressions to predict reputational rankings and auction sales, imputing both 25 (log) and 15 (log) for individuals who did not receive a ranking in either 2013 or 2015. First, we create a dummy variable indicating if the jury commented on a particular criterion during the evaluation of the applicant; if yes, a value of 1 was given, otherwise a 0. Second, we created a variable indicating the maximum score the applicant received per criterion, as determined by the highest score given by any of the three raters. And third, we used only the scores of one rater (one of the authors). All alternative operationalizations in all models were similar to our focal equations in the parametric switching regressions.

### 2.7.1 Alternative selection simulations

For the observed accepted applicants and the observed rejected applicants we have mean characteristics and mean performance outcomes. We now simulate a change in the composition of the accepted and rejected applicants by changing the admission rules, while still maintaining the proportion of applicants admitted. We do this to see if selection “by flipping a coin” or using alternative selection rules result in different performance outcomes compared to our observed sample population. First, using the entire sample (n=697), we simulate selection based upon a coin toss. Second, we replace the estimated coefficients in our main selection equation by the selection criteria weights, as rated by the selection committee members and the head of the residency program, for a sub-sample of applicants with jury notes (n=355), while keeping all other coefficients at their estimated value. We then select the top 43% of these applicants, which is proportionally equivalent to the observed sample, as accepted and reject the rest. We are aware that alternative admission rules can change artists’ status; namely, we may admit artists who were originally rejected and reject those who were originally admitted; hence there is a

selectivity issue. However, we argue that with these data selectivity is inconsequential because the two performance equations from the observed sample population are not statistically different from one another. Therefore, we may use the observed output even if the applicant, with the alternative selection rules, has been reallocated to another status.

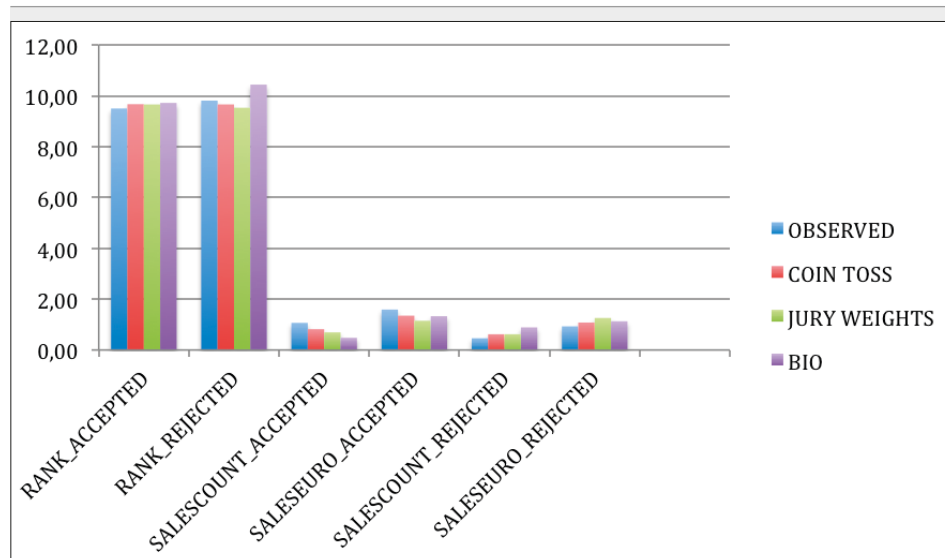
Comparing the mean performance outcomes of our observed sample population to the estimated performance outcomes from the coin toss and jury weight simulations, we observe that the accepted observed sample population performs slightly better than the simulations. For instance, the log mean artistic ranking for accepted applicants in our observed sample population is 9.50, while the log mean artistic rankings based on chance and jury weights are slightly worse, 9.67 and 9.66, respectively. The accepted observed sample population also sells a slightly greater number of artworks at auctions for a slightly higher price compared to the performance outcomes of the two simulations. The rejected artists from these simulations perform slightly better than the rejected artists from the observed sample population.

Based upon this comparison, it is possible to speculate as to why the accepted observed sample population performs slightly better across both performance outcomes compared to the accepted artists in the simulations, and why the rejected in the observed sample population perform slightly worse across both performance outcomes compared to those rejected in the simulations. The coin-toss and jury weight simulations include artists who were accepted according to alternative selection rules. This means that some applicants were accepted in our observed sample population yet rejected in the simulations, and visa versa. For instance, of the 157 artists accepted according to the jury weight simulation, 86 were also accepted in the observed sample population, while 71 of these “newly” accepted artists were rejected by RABK. The coin toss simulation consisted of 299 “newly” accepted artists, of which 114 were also accepted in the observed sample population, while 185 were rejected.

One possible way to interpret these differences in performance outcomes between the observed sample population and the simulations is that a residency at RABK is a signal of quality to the international contemporary art market. Such a signal of quality is important, since, as noted before, there are no objective measures to determine the quality of artists or artworks and the market in general is also characterized by high uncertainty (Caves, 2000; DiMaggio, 1987; Yogev, 2010; Velthuis, 2013). Signaling theory (Spence, 1973) describes how signals, e.g. an elite education or participation in a prestigious program, help create a separating equilibrium based on an inverse cost quality relationship, in which receiving or sending a signal is less costly for a high quality producer compared to those of lesser quality (Spence, 1973; Connelly, Certo, Ireland and Reutzel, 2011). It is possible that RABK acts as a proxy of quality in the international contemporary art market, by reducing uncertainty about quality caused by incomplete or imperfect information. Precisely the fact that the RABK can be seen to represent peers can increase the credibility of the signals it produces to other peers (Ebberts and Wijnberg, 2012) and experts who tend to respect peer judgments in high art. This would help explain the slightly better performance outcomes of the accepted applicants, compared to the simulations, and the slightly worse performance outcomes of the rejected applicants, compared to the simulations.

Another possibility is that RABK functions as it aims: namely, to help develop talent in visual arts. Perhaps the accepted applicants learn something to help them develop and deepen their art practice and/or are granted access to an international network of art critics, curators and collectors. Or perhaps the selection committee systematically picks excellent artists. One thing is for sure, changing the selection rules to fit the weights of the jury (as described by committee members and the head of residency) does not increase applicants' performance outcomes, nor does simply chance. Apparently, being accepted to RABK positively affects artists' future performance.

**FIGURE 2.6** Performance outcomes (log) for the observed sample population and simulations



## 2.8 CONCLUSIONS

The Rijksakademie van Beeldende Kunsten (RABK) has kept detailed records of the selection processes for its internationally highly prestigious program that provides promising artists a two-year residency with full facilities. We combined information from this selection process with data on later performance of accepted and rejected artists, to assess the selection process in terms of artistic prestige and economic success. Almost 75% of both accepted and rejected artists in our analysis had rankings of artistic standing, suggesting that most remained active in the art market, although only a small percent (13%) ever sold artworks at an art auction. This can be explained by the fact that artists active on the primary art market usually sell their artworks through art galleries or directly to art collectors, rather than at art auctions (Prinz, Piening and Ehrmann, 2015). Nevertheless, a skewed distribution of success is common in the cultural industries (Caves, 2000), as can be observed with our data, as those artists who sold artworks at art auctions career average sales totaling €167,552.10 (minimum €228.78 and maximum €7,762,842).

As mentioned earlier, RABK aims to admit exceptionally talented artists and to facilitate their development to the top of the international art world. We analyze the interview round of the admission procedure where a selection committee selects applicants in an informal process relying on objective biographical data and subjective assessments of applicants' artistic qualities and potential for development. These assessments are based on criteria that have not been formalized and weighted in explicit statements but were retrieved through non-participatory observation and interviews with selection committee members. The discussion on criteria scores for applicants is not structured along formal rules; to distill this information three raters interpreted the comprehensive jury deliberation notes and assigned scores. Our first conclusion is that the selection committee operates differently than the way she thinks she does: the weights of the criteria that we estimate from the observed admission decisions are not equal to the weights intended by the selection committee.

Nevertheless, in a general sense, the selection committee seems to have realized their aim of selecting exceptional talent and facilitating development to leading positions in the art world. The admission decision appears to relate positively to the applicant's later success; artists with better artistic ranking and more sales have higher probability of admission. The mean artistic ranking of accepted applicants is indeed (weakly) statistically higher than the mean ranking of rejected applicants; visual inspection indicates that accepted applicants have a smaller lower tail in their frequency distribution of rankings than the rejected applicants.

Analysis of the admission process shows that among the biographic data, nationality, a reference letter and repeated participation in the jury process have a significant effect on the admission decision. Among the separate jury criteria, significant monotonic effects are not the rule. Scoring above average on content, creativity, collaboration and fit have a clear positive effect, scoring below average on these same criteria has a clear negative effect.



The final jury assessment, combining much information collected in the selection processes, on its own has a strong effect on the admission decision. Averaging the assessments into three variables shows that artistic quality and fit to the RABK goals have significant effect on the admission decision, while personality does not. Our second conclusion is that multiple selection criteria predict admission, although the overall final jury assessment seems to have a stronger effect.

From a switching regression model, where the effect that unobserved qualities governing admission may have on performance is taken into account, these unobservables appear to increase the likelihood of admission and the likelihood of superior performance for the accepted applicants, while reducing performance for the rejected. Thus, admission increases the difference in performance outcomes of the accepted and the rejected and as such may be inferred to function as a signal of quality; although the performance equations for accepted and rejected artists are not statistically different from each other. This means that the effect of measured qualities as perceived by the jury on later performance does not differ among applicants who have resided at RABK for two years and applicants that have not been admitted. The result is more positive however, on the joint effect of variables that we, as outsiders, do not observe but the selection committee does. The Mills ratio is significant for both the accepted and the rejected in the case of rankings, but not significant for sales. Accepted artists have unobserved qualities that lead to higher rankings and rejected artists have unobserved qualities that lead to lower rankings. This can be taken as a credit for the selection process: the jury recognizes more than we can observe. This also may explain why the jury's final assessment of an applicant, purged from the effect of the specified selection criteria, has a significant effect on the admission decision. Yet, this final assessment score only has substantial and significant effect on artistic ranking, and no effect on sales performance. Our third conclusion is that multiple selection criteria, and the final jury assessment, predict artistic rankings but not sales. Artistic ranking is predominately determined by peer selection. Perhaps the selection committee, consisting primarily of peers, recognizes and acts upon the shared beliefs and agreements about novelty, contribution and maintaining high quality standards shared by others peers across the board (Kostoff, 1997; Eisenhart, 2002), which would help explain the effect on rankings but not on auction sales, which might be less strongly influenced by signals of peer appreciation and more by signals coming from experts or even other customers (Ebbers and Wijnberg, 2012; Gemser, Leenders and Wijnberg, 2008).

In the end we must conclude that our findings are very much in line with the literature. Predicting success in creative occupations, in other words picking the winners, is quite a challenge. Unstructured interviews have a poor record. Careers of accepted and rejected artists are different because artists unobserved attributes, such as ability and perseverance, may differ at entry, and not simply because the residency substantially increases the pay-off to their qualities. The caveat is of course that our entire analysis is based on the sample of artists who passed all the initial selections: our findings only relate to those artists that have made it to the final round.

## 2.9 APPENDIX

### APPENDIX A: Selection criteria per round

Selection round	Interview round	Criteria	Description	Importance			
15%	15%	<i>Socio-Demographic</i>	Candidate is in target age group (26-36)	4			
			Candidate is male/female	1			
			Candidate is male/female (Interview)	4			
			Candidate has independent art practice > 2 years	4			
			Country of origin (Silent Zones)	4			
			Country/city of current residency	4			
10%	0%	<i>Education</i>	Previous art education (bachelor/master degree)	3			
			Previous art residencies	4			
			Previous higher education outside art	2			
			Graduating with honors	2			
10%	0%	<i>Number of Times Applied</i>	Candidate applied previously	1			
			Amount of times previously applied	2			
			Highest selection previously achieved (Interview)	4			
			Candidate knows RABK advisor(s)	4			
			Candidate knows RABK past /present resident(s)	4			
15%	0%	<i>Letter of Recommendation</i>	From RABK advisor	4			
			From well-known artist	4			
			From unknown artist	2/3			
			From prominent non-artist	3			
5%	0%	<i>Written application</i>	Text about work/expectations from RABK	2/3			
			45% (25%)	80% (20%)	<i>Art work/ Portfolio</i>	Content	4
						Research based/ work in progress	4
						Evolution of work over time/ continuity	4
						Problem finding orientation	4
						Art historical reference(s)	4
			(20%)	(15%)	Context	4	
			(10%)	(5%)	Craft	2	
			15%	(10%)	Creativity	Innovative ideas/ methods	5
						Originality	4
						Novel contribution	5
			(0%)	(5%)	Expertise	Diverse expertise (art/non-art)	4
			(10%)	(15%)	Critique	Open to assessments/criticism/ change	4
(10%)	(15%)	Communication	Purpose/reason for making work	5			
			Professional awareness/confidence	4			
(10%)	(15%)	Career Fit		5			
		<i>Personal<sup>29</sup></i>					
		Collaboration	Jury member would like to work with artist				
		Contradiction	Jury had opposing assessments				
		Personality	Jury liked the artist				
		Final assessment					

<sup>29</sup> Personal characteristics or final assessment did not receive weights; these criteria were recorded after analysis of the jury notes.

## APPENDIX B: Applicants by cohort year

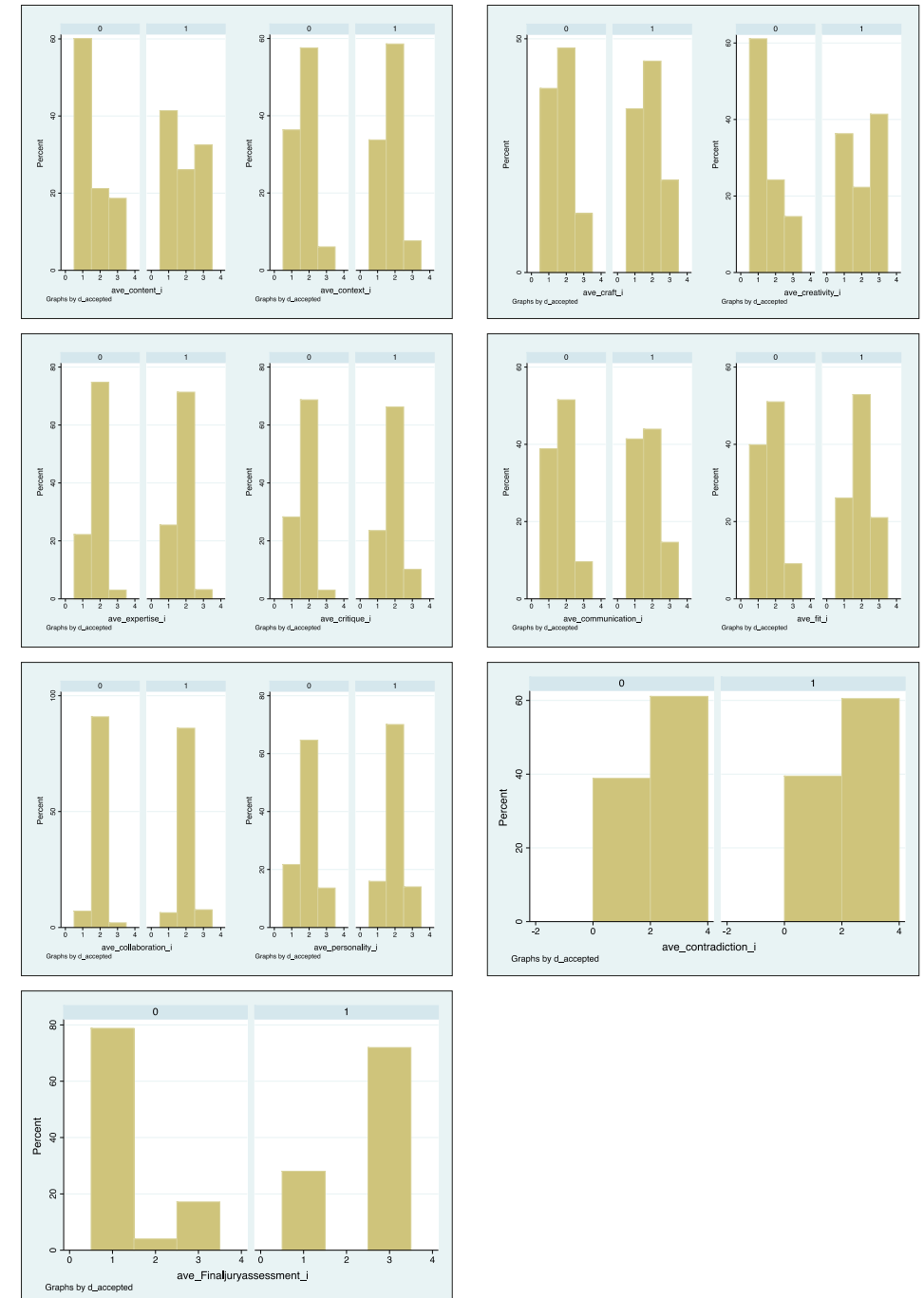
### RABK : All Applicants during observation period

Year Applied	Year Started	Applications	Selection	Interview	Accepted	Rejected
1995	1996	680	680	69	33	36
1997	1998	672	672	71	25	46
1999	2000	666	666	51	27	24
2000	2001	606	606	65	32	33
2001	2002	634	634	56	27	29
2002	2003	950	950	54	29	25
2003	2004	947	670	59	27	32
2004	2005	844	469	62	23	39
2005	2006	830	440	64	25	39
2006	2007	1096	565	75	25	50
2007	2008	1324	296	71	26	45
<b>Total:</b>	<b>11 years</b>	<b>9249</b>	<b>6648</b>	<b>697</b>	<b>299</b>	<b>398</b>

## APPENDIX C: Variables

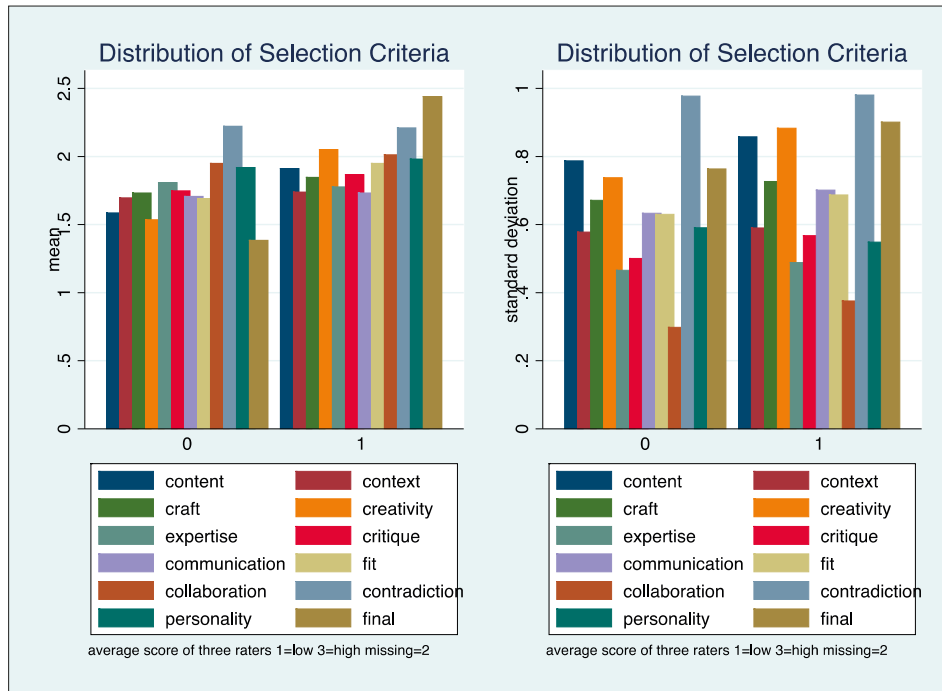
Variable name:	Description:	Variable type
<i>d_accepted</i>	accepted to RABK(1), rejected from RABK(0)	binary
<i>d_female</i>	gender: female (1), male (0)	binary
<i>age_interview</i>	age at interview	continuous
<i>age2</i>	age at interview (squared)	continuous
<i>career_age</i>	year applied minus 2015	continuous
<i>career2</i>	year applied minus 2015 (squared)	continuous
<i>d_nation</i>	Dutch nationality (1), other (0)	binary
<i>d_no_art_ed</i>	no formal previous art education (1), formal previous art education (0)	binary
<i>d_ref_letter</i>	reference letter (1), no reference letter (0)	binary
<i>d2xinterview</i>	went to interview round in subsequent year(s) after being rejected (1), interviewed once (0)	binary
<i>d_sculpture</i>	main artistic discipline sculpture (1), otherwise (0)	binary
<i>d_video_film</i>	main artistic discipline video/film (1), otherwise (0)	binary
<i>d_drawing</i>	main artistic discipline drawing (1), otherwise (0)	binary
<i>d_photography</i>	main artistic discipline photography (1), otherwise (0)	binary
<i>dauctionc</i>	auction sales (1), no auction sales (0)	binary
<i>dArtFacts.Net2013</i>	2013 ArtFacts.Net rank (1), no rank in 2013 (0)	binary
<i>dArtFacts.Net2015</i>	2015 ArtFacts.Net rank (1), no rank in 2013 (0)	binary
<i>d_2015_13</i>	2015 ArtFacts.Net rank in either 2013 or 2015 (1), otherwise (0)	binary
<i>d_jury1995_1998</i>	change in selection process: jury specialized in core discipline of the applicant made the final selection (1), 1999-end of observation period multi-disciplinary jury assessed the work from all applicants (0)	binary
<i>content</i>	development of the artist/artworks over time. low score (1), missing score (2), high score (3)	discrete
<i>context</i>	artists' understanding of art historical references. low score (1), missing score (2), high score (3)	discrete

**APPENDIX D: Distributions of multiple selection criteria score among the sample**

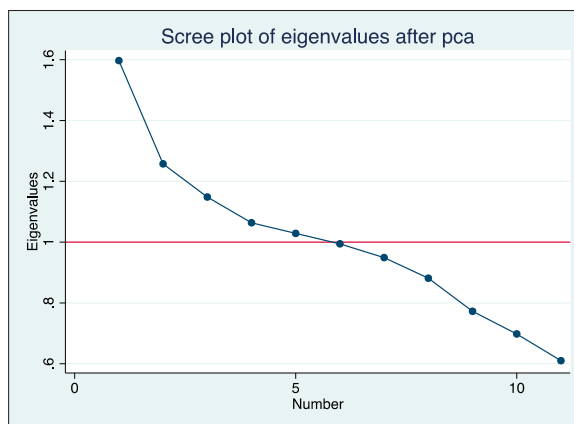


<i>craft</i>	technical aspects of the artwork/ ability in actually making the artwork. low score (1), missing score (2), high score (3)	discrete
<i>creativity</i>	innovative aspects/ novel contribution of the artwork. low score (1), missing score (2), high score (3)	discrete
<i>expertise</i>	art education or combinations with other academic disciplines low score (1), missing score (2), high score (3)	discrete
<i>critique</i>	openness of the artist is to criticism and change low score (1), missing score (2), high score (3)	discrete
<i>communication</i>	ability to communicate about their artworks and reason for making the artworks low score (1), missing score (2), high score (3)	discrete
<i>fit</i>	artists' career and the fit within the RABK community low score (1), missing score (2), high score (3)	discrete
<i>collaboration</i>	would the jury member(s) like to have the artist as a colleague low score (1), missing score (2), high score (3)	discrete
<i>contradiction</i>	level of opposing views between jury members about an applicant: complete or partial disagreement between jury members (1), missing score (2), complete agreement (3)	discrete
<i>personality</i>	does the jury liked the personality of the applicant low score (1), missing score (2), high score (3)	discrete
<i>final assess</i>	jury final assessment of the applicant overall negative evaluation (1), overall positive evaluation (2)	discrete
<i>art</i>	average score of the selection criteria: <i>content, craft, creativity</i> Low score (1), no score (2), high score (3)	discrete
<i>rabk_goals</i>	average score of the selection criteria: <i>fit, context, critique</i> Low score (1), no score (2), high score (3)	discrete
<i>personality</i>	average score of the selection criteria: <i>Expertise, Communication, Collaboration, Contradiction, Personality</i> Low score (1), no score (2), high score (3)	discrete
<i>log2013ArtFacts.Net</i>	ArtFacts.Net score in 2013 (log)	continuous
<i>log2015ArtFacts.Net</i>	ArtFacts.Net score in 2015 (log)	continuous
<i>logmean2013_2015</i>	average 2013 and 2015 ArtFacts.Net scores. For those ranked in either 2013 or 2015, the average rank is the rank they received in that particular year.	continuous
<i>res_log2015ArtFacts.Net</i>	residual of log2015ArtFacts.Net purged of career age and career age2 effects	continuous
<i>res_log2013ArtFacts.Net</i>	residual of log2013ArtFacts.Net purged career age and career age2 effects	continuous
<i>res_logmean2013_2015</i>	residual of logmean2013_2015 purged career age and career age2 effects	continuous

**APPENDIX E: Means and standard deviations of selection criteria**



**APPENDIX F: Principle components analysis (PCA)**



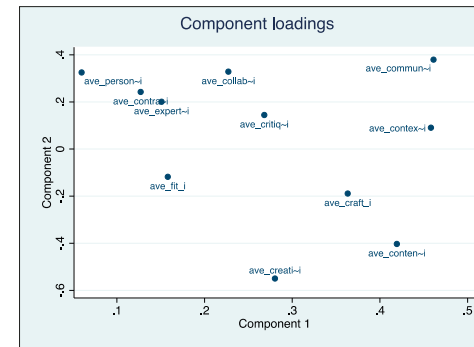
**Principal components/correlation**

Number of obs = 355  
 Number of comp. = 3  
 Trace = 11  
 Rho = 0.3639

**Rotation: orthogonal varimax (Kaiser off)**

**Rotated components (blanks are abs(loading) < .3)**

VARIABLE	COMP1	COMP2	COMP3	UNEXPLAINED
CONTENT		0.5332		.5149
CONTEXT	0.4665			.6335
CRAFT	0.3335		-0.4682	.5209
CREATIVITY		0.6910		.3679
EXPERTISE				.865
CRITIQUE			0.5307	.5597
COMMUNICATION	0.5713			.479
FIT				.8925
COLLABORAION	0.3621			.7757
CONTRADICTION				.8677
PERSONALITY			0.6335	.5203



The Kaiser-Meyer-Olkin measure of sampling adequacy shows that PCA is acceptable at kmo >.50; our overall score was 0.5209, with the lowest value being for the collaboration variable which had a value of 0.4432.

We also conducted a factor analysis to check for underlying lower dimensionality of the data set. The three factors in our factor analysis were similar to the three components in our PCA.

**APPENDIX G: Correlation Matrix**

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.
1. AVE_CONTEN-I	1.0000														
2. AVE_CONTEX-I	0.0912	1.0000													
3. AVE_CRAFT_I	0.1611	0.1535	1.0000												
4. AVE_CREATI-I	0.2581	0.0695	0.0565	1.0000											
5. AVE_EXPERT-I	0.0446	0.0737	-0.0156	-0.0019	1.0000										
6. AVE_CRITIQ-I	0.0051	0.0708	0.0121	0.1204	-0.0401	1.0000									
7. AVE_COMMUN-I	0.0815	0.2158	0.1423	-0.0235	0.1024	0.1277	1.0000								
8. AVE_FIT_I	0.0678	0.0826	-0.0241	0.0535	-0.0373	0.0254	0.0419	1.0000							
9. AVE_COLLAB-I	0.1095	0.0394	0.0032	-0.0888	0.0594	0.1168	0.1110	-0.0070	1.0000						
10. AVE_CONTRA-I	-0.0249	0.0640	0.0485	-0.0198	-0.0071	-0.0087	0.0683	0.0258	0.0494	1.0000					
11. AVE_PERSON-I	-0.0067	0.0050	-0.1070	-0.0029	0.0113	0.0851	0.1164	-0.0051	-0.0210	0.0259	1.0000				
12. AVE_FINAL-I	0.2585	0.1185	0.1510	0.2273	0.0128	0.1320	0.0786	0.1890	0.0930	0.1137	0.0160	1.0000			
13. ART QUALITY	0.7345	0.1526	0.5551	0.6932	0.0156	0.0722	0.0930	0.0536	0.0117	-0.0023	-0.0522	0.3235	1.0000		
14. RABK GOALS	0.0924	0.6179	0.0730	0.1285	-0.0030	0.5412	0.2029	0.6665	0.0737	0.0456	0.0411	0.2429	0.1492	1.0000	
15. IND QUALITY	0.0566	0.1628	0.0461	-0.0427	0.3602	0.0914	0.5663	0.0205	0.3047	0.6725	0.4331	0.1342	0.0273	0.1438	1.0

## CHAPTER 3

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### **LOOKING FORWARD TO THE PAST:**

The Effects of Past Sales and Signals on Expert Buyers

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## ABSTRACT

In markets where quality differences between producers may be hard-to-observe, signals convey information about quality and past performance, helping some producers gain a competitive advantage over their rivals. If this advantage is persistent then past performance, as a hard-to-imitate non-material resource, helps describe inequalities in the distribution of success, particularly in markets where underlying quality differences between producers may be indeterminate. Analyzing 22 years of unique sales and signal data about 471 contemporary visual artists who are alumni from an elite art institution, we study the extent to which past sales, different kinds of signals, i.e., reviews, awards and affiliations, and the credibility level of third party sources transmitting those signals influence expert buyers' purchase decisions. Our results show strong self-reinforcing processes governing competitive dynamics. We provide empirical support showing significant increases in producers' sales in a given year in relation to the number of past signals of the same kind received in the preceding year. But per kind of signal this increase has differential effects on sales, which can be attributed to the level of credibility of the third party source transmitting the signal. We also find that past sales significantly affect future sales. Our results provide evidence that expert buyers infer quality from signals concerning past performance, and also the past performance itself, which provides new insights into the persistence of performance differentials between producers.

### Keywords

*Quality signals, source credibility, expert buyers, uncertainty, non-linear panel data models*

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## 3.1 INTRODUCTION

In markets where producer quality is not easily visible or discernible because it may either be latent or require specialized knowledge to detect underlying differences among competitors, some producers repeatedly outperform their rivals. An obvious explanation for this is that these producers possess exceptional talent or abilities that provide them with a superior competitive advantage compared to other competitors. Yet even between producers with minute or undetectable differences in underlying attributes, some producers still consistently outperform others (Rosen, 1981; Merton, 1968).

An alternative explanation to understanding inequalities in the distribution of success is rooted in producers' past performance, and particularly in the signals conveying quality information about that performance. Especially if producers' quality is indeterminate, signals help reduce pre-purchase uncertainty by providing publically available information about unobservable or indiscernible quality (Spence, 1973). In markets with many producers, limited possibilities to evaluate all tenable alternatives in a choice set and imperfect and incomplete information about producers' quality in that set, signals help buyers in their pre-purchase decision making. Signals facilitate economic exchanges by acting as proxies of quality that enable commensurability, i.e., relative comparison between contending producers, and make producers' past performance public (Spence, 1973, 1974; 2002; Connelly, Certo, Ireland and Reutzel, 2011; Espeland and Steven, 1998). The literature on observational learning (Bandura, 1977; Bikhchandani, Hirshleifer, Welch, 1998,) and small world networks (Milgram, 1967; Uzzi and Spiro, 2005) has also shown that buyers' purchases, if observable to others buyers, act as signals of quality that can directly affect the purchase decisions of those observing the signal (Salganik, Dodds and Watts, 2006; Salganik and Watts, 2009).

Research has shown that past performance can be considered a hard-to-imitate resource if *ex ante* it persistently provides producers' access to opportunities not available to other competitors (Merton, 1968; Azoulay, Stuart and Wang, 2013). Past performance may even elicit preferential treatment *ex post* when performance outcomes are based upon evaluations of third party sources (Waguespack and Salomon, 2015). In markets where quality is difficult to determine *a priori* (Nelson, 1970; 1974), the construction of producers' quality can be directly observed through signals, facilitating post signal comparisons based on whether producers with a particular signal outperform their competitors (Spence, 1973, 1974; 2002; Bergh, Connelly, Ketchen and Shannon, 2014). This means that some signals may have a greater effect on producers' performance outcomes, and this may help trigger preferential treatment to those producers who have outperformed others in the past, granting them opportunities not afforded to others. Especially in markets where quality differentials between competing producers are hard to observe directly, third party signals can help select producers gain access to better opportunities compared to their rivals. If this leads to superior performance, than a self-reinforcing feedback mechanism may be created, further increasing the performance differentials between these competitors (Merton, 1968; Azoulay et al., 2013).

In this paper, we study the extent to which past performance, and especially signals conveying information about that performance, affect producers' sales in terms of expert

buyers' purchase decisions. A distinction can be made between producers who signal about themselves (e.g., Spence, 1973; Chung and Kalnins, 2001; Kirmani and Rao, 2000), and third party sources, who may have different levels of source credibility, i.e., expertise and trustworthiness (Hovland, Janis, and Kelley, 1953; Ohanian, 1990; Meyer, 1988; Newell and Goldsmith 2001), but nevertheless evaluate producers' quality and disseminate that information to a broader public (Sauder, 2006). In general, we concentrate on third party sources transmitting these focal kinds of signals about producers: reviews, awards, and affiliations; we also include producers' past sales as signals of quality. And then specifically, we analyze the extent to which a) quantitative characteristics i.e., the number of past sales and the number of signals of a particular kind received in time  $t-1$ , b) qualitative dimension, i.e., the credibility level of the third party sources transmitting the signals in time  $t-1$  and c) the interaction effect between the number of signals and the source credibility levels, affect both the absolute number of sales and the sales price paid by expert buyers in time  $t$ .

Focusing on a market with quality information imperfections, and where buyers have limited possibilities to search for information about all competing alternatives, we contribute to the literature by analyzing the differences between the effects of different kinds of signals and different levels of source credibility; possibly our strongest contribution is that we establish that past sales, and past signals moderated by the credibility level of the third party sources transmitting those signals, have strong yet differential affects on producers' sales, both in terms of the number of sales and the sales price paid. Referring to signaling theory (Spence, 1973), which provides a useful framework to help distinguish between high and low quality producers, we test the strength of the effect of each kind of signal about producers' past performance on buyers' purchase behavior. Focusing on a homogenous cohort of competitors, with near equal training and technical abilities, we provide empirical evidence that signals and past sales systematically affect the purchase decisions of expert buyers, thus influencing the dynamic process of competitive differentials among producers. This category of buyer has high-levels of specialized knowledge and access to information in their professional networks, which help them form beliefs about desired producer attributes and decision rules for acting on those beliefs (Alba and Hutchinson, 1987; Moorthy, Ratchford and Talukdar, 1997). We empirically demonstrate that the number of sales and the number of signals in a given year positively increase the likelihood of producers' products to be purchased in the following year. However, per kind of signal the increase in the quantity of sales and sales price is different, and this difference is caused by the level of credibility of the third party source transmitting the signal.

We extend our study to a new empirical domain in the creative industries: the contemporary visual art market. Extant research has shown the cultural industries are rife with uncertainties caused by informational gaps about producers' quality. The literature provides empirical evidence on how signals help buyers overcome pre-purchase uncertainty across a variety of markets, such as: movies (e.g., Eliashberg and Sujan, 1997; Basuroy, Chatterjee and Ravid, 2003; Lehmann and Weinberg, 2000; Elberse, 2007; Gemser, Leenders and Wijnberg, 2008; Lui, 2006; Chen, Liu, and Zhang, 2012); luxury fashion (Fuchs, Prandelli, Schreier and Dahl, 2013); video games (Zhu and Zhang, 2010) classical music (e.g., Ginsburgh and Van Ours, 2003; Glejser and Heyndels, 2001) and novels (e.g., Berger, Sorensen, and Rasmussen, 2010). These earlier

studies focusing on the effects of third party signals of quality on buyer behavior, analyzed the effects of signals, which directly concern the focal product of interest, on uninformed buyers. We add to this stream of literature by focusing on expert buyers and focusing on signals that concern the prior performance of producers, largely occasioned by products that have been sold in the past.

In the empirical setting of the contemporary visual arts, we analyze a unique longitudinal dataset consisting of 471 visual artists, i.e., painters, sculptors, photographers, and video and installation artists, from an internationally renowned fine arts program located in the Netherlands. The artists, whose career trajectories we study over a 22-year observation period, are predominately active in the primary art market, where artworks are sold for the first time as opposed to re-sold on the secondary or auction markets (Singer and Lynch, 1994). An important category of expert buyers active in this market are corporate art collectors. Over half of the Fortune 500 companies and other corporations worldwide have a corporate art collection (Kottasz, Bennett, Savani, Mousley, and Ali-Choudhury, 2007; Kottasz, Bennett, Savani, and Ali-Choudhury, 2008), employing expert buyers who mostly purchase art for these collections on the primary art market (Wu, 2002). The corporate art collectors in our study account for 77% of the sales made to corporate collections in the Netherlands during our observation period from 1990 to 2012 (www.vbcn.com). We analyze these data estimating Poisson regressions with cohort and discipline fixed effects. Using panel data, we estimate sales results, both the number of sales and the sales price<sup>30</sup> paid by corporate art collectors based upon past sales, the focal kinds of signals, and the credibility of the third party sources transmitting these signals, that artists received in the previous year.

The remainder of this paper is organized as follows: In the next section we review existing literature on signals of quality, expert buyers, source credibility, commensurability of signals and observational learning; and we present our hypotheses. In the subsequent section we describe our empirical setting of the contemporary visual arts; followed by a description of our modeling approach, data and the empirical analysis used to test our hypotheses. We conclude with a discussion of the results, managerial implications, and limitations and avenues for future research.

## **3.2 THEORETICAL FRAMEWORK AND HYPOTHESES**

### **3.2.1 Signals and pre-purchase uncertainty**

Art, movies, novels, fine wine, financial assets, health care and other professional services are examples of products surrounded by quality uncertainty, albeit in varying degrees. In marketing, classifying goods and/or services based upon the availability of pre-purchase quality information is widely accepted in the literature (Klein, 1998). For instance, experience goods, in contrast to search goods, are products or services whose quality is not readily observable or discernable *a priori* (Nelson, 1970, 1974).

<sup>30</sup> Poisson regressions provides consistent estimates even when the dependent variable is not an integer and contains many zero observations (Santos Silva and Tenreiro, 2006, 2011).

A further differentiation can be made between goods with pre -and post- purchase quality uncertainty. Credence goods are products and/or services, e.g., vitamins or higher education, whose quality can never really be known with certainty, but rather post purchase assessments are made based upon buyers' beliefs in the quality of those products (Darby and Karni, 1973). Signals are helpful in reducing pre-purchase uncertainty about quality of both experience and credence goods because they act as proxies of quality. Quality, in this context, can be described as the "underlying and unobservable ability of a producer to fulfill the needs of buyers observing the signals" (Connelly et al., 2011, p.43). One of the mechanism behind pre-purchase uncertainty reduction is rooted in how signals "separate" between competing producers' quality.

Signaling theory (Spence, 1973) provides a useful framework to describe how signals, through the creation of a separating equilibrium, help distinguish between high and low quality producers. In his seminal paper, Spence (1973) described a separating equilibrium in the empirical setting of the labor market by illustrating how higher education is a signal of high quality because it would be too difficult, or costly, for low quality job applicants to transmit such a signals. Signals help create a separating equilibrium based on an inverse cost quality relationship, in which being the subject of a signal or sending a signal is less costly for a high quality producer compared to those of lesser quality (Spence, 1973; Connelly, Certo, Ireland and Reutzel, 2011). Marketing research has focused on signals as sources of valuable information about hard to observe quality, ranging from advertisements and warranties (e.g., Chung and Kalnins, 2001; Kirmani and Rao, 2000), to awards and reviews, (e.g., Anand and Watson, 2004; Eliashberg and Shugan, 1997). Signals can be transmitted directly by first party sources, i.e., producers, as illustrated by Spence (1973), or from third party sources. It is reasonable to expect that some signals from some sources are more persuasive, hence, more effective than others. One way to understand the persuasive power of signals is by differentiating between the sources transmitting the signal. This is an important distinction because third party sources compared to first party sources may trigger distinctive cognitive processes in buyers, which may result in different purchase outcomes (Lurie, 2004; Lynch and Ariely, 2000).

On the one hand, first party signals conveyed directly by the producer- e.g., advertisements and warranties -provide quality information, however, this information may be biased because the producer has an evident self-interest in influencing buyer behavior. Especially in markets with high pre-purchase quality uncertainty, this can decrease the informative value of the signal if there is the perception from the buyer that the signal is biased or false (Kelley, 1967; Eagly and Chaiken, 1975; Mizerski, Golden and Kernan, 1979). On the other hand, third party sources transmitting signals, e.g., reviews (Eliashberg and Sukan, 1997; Basuroy, Chatterjee and Ravid, 2003), awards (Anand and Watson, 2004; Gemser, Leenders and Wijnberg, 2008), and affiliations or business relationships (Rindova, Williamson, Petkova, and Server, 2005; Simcoe and Waguespack, 2011). Third party sources are perceived to be relatively fair and impartial in conveying quality information to potential buyers<sup>31</sup> (Lampel and Shamsie, 2000; Pollock and Rindova, 2003; Dean and Biswas, 2001; Higgins and Gulati, 2003) because if they do not than these sources risk incurring costs, e.g., financial and/

or reputational, and jeopardizing their position in the market (Spence, 1973; Ippolito, 1990; Kirmani and Rao, 2000; Bergh et al., 2014). Earlier studies have shown that signals from third party sources help shape producers' reputations (Higgins and Gulati, 2003) and help define status hierarchies (Scott, 1994; 1995).

Especially in markets with informational gaps, signals originating from third party sources play an important role in helping to convey information about producers' unobservable or latent quality. Signals help create (and maintain) structuring mechanisms, e.g., rankings or other segmentation, that enable relative comparisons between producers (Spence, 1973, 1974; 2002; Bergh, Connelly, Ketchen and Shannon, 2014). Structuring mechanisms cause hierarchies among producers to be created, explicitly informing buyers about what is "good" and what not by demarcating boundaries that separate high quality producers from those of lesser quality (Anand and Watson, 2004). Rankings and other segmentation mechanisms are standardized ways to judge competitors and reduce uncertainty through commensuration in decision-making (Espeland and Stevens, 1998). Commensuration is a socially influenced process in which heterogeneous information about producers' quality is reduced into a common metric that helps to reveal and represent value in competitive environments (Espeland and Stevens, 1998). This is important because commensurability among competing alternatives can affect pre-purchase decision-making and the likelihood of economic exchange.

### 3.2.2 Expert buyers and numbers of signals

Research focusing on buyers' decision making processes between competing alternatives in terms of their information search intensity has shown that, in general, buyers conduct limited pre-purchase information search activities (e.g., Moorthy, Ratchford, and Talukdar, 1997; Huang, Lurie and Mitra, 2009), even for items such as automobiles (Beatty and Smith, 1987; Newman, 1977; Wilkie and Dickson, 1985). However, the buyers in many of these studies lacked familiarity and/or factual knowledge about what they were purchasing, raising the costs associated with learning where and how to search for information and interpret the accumulated information. As previous research has shown, this may overwhelm buyers and result in abbreviated searches for information, even for high-ticket items (Beatty and Smith, 1987; Newman, 1977; Wilkie and Dickson, 1985). Compared to uninformed buyers, expert buyers, have high-levels of expertise, professional knowledge and access to information in their networks (East, 1992). Therefore, they have a greater ability to analyze, interpret, and make accurate judgements from limited information, further accentuating the ratio between higher payoffs at lower costs (Alba and Hutchinson, 1987; Moorthy et al., 1997).

However, even these expert buyers may still find it difficult to unequivocally integrate information on the basis of many possible kinds of signals of quality about many competitors in a market environment characterized by high overall uncertainty. It seems reasonable to assume that expert buyers' confidence in their judgments about particular producers increases with the availability of many signals of a particular kind about those competitors. A higher number of signals also increase producers' visibility and may function as a heuristic helping expert buyers who, because of time scarcity or other costs, are unable to search for information about all competing alternatives. Moreover, a greater number of signals of a particular kind may

<sup>31</sup> Producers' past sales are signals of quality (Vogel, Evanschitzky and Ramaseshan, 2008; Miklos-Thal and Zhang, 2013) if observable to other buyers (Salganik and Watts, 2009; Salganik, Dodds and Watts, 2006).



be perceived as an aggregate indicator of quality, and provide a basis for evaluations rooted in comparison among alternatives, especially when expert buyers have limited possibilities to evaluate all competitors in the market. The commensurability between producers based upon this common metric, i.e., number of signals, provides additional information to expert buyers about the producer's quality. When considering these arguments, we propose that the greater the number of signals of a certain kind, the more confident expert buyers become about producers' quality and their own judgments, which translates into a greater likelihood of purchase.

Thus, in markets in which the available signals originating from third party sources are of different kinds and these different kinds may have different effects on expert buyers, we argue that there is a positive correlation between the number of signals of each kind transmitted by third party sources about a producer in a particular year and sales in the following year. Therefore, we propose the following hypotheses:

*H1a: In a given year, the greater the number of signals of a particular kind originating from third party sources about a producer, the greater the number of sales to expert buyers in the subsequent year.*

*H1b: In a given year, the greater the number of signals of a particular kind originating from third party sources about a producer, the higher the price paid by expert buyers in the subsequent year.*

### 3.2.3 Expert buyers and source credibility of third party sources

Precisely because expert buyers are assumed to be highly skilled professionals, they are likely to explicitly take into account source credibility levels. Previous research has shown that the credibility of the source emitting a signal is an important determinant of the strength and impact of a signal (Sternhal, Dholakia and Leavitt, 1978; Pornpiktapan, 2004). Source credibility is a function of the source's expertise and trustworthiness. Expertise refers to the extent to which a source is perceived to have knowledge and experience (Hovland, Janis, and Kelley, 1953; Ohanian, 1990), while trustworthiness refers to the extent to which buyers perceive a source to be honest and dependable (Hovland et al., 1953; Meyer, 1988; Newell and Goldsmith 2001; Ohanian, 1990).

Earlier research has shown that if source credibility is high, customers are willing to accept the signal. However, if source credibility is low then attribution theory (Kelley, 1967) helps explain why buyers find the signal less persuasive. According to attribution theory, buyers do not accept signals at face value but rather first evaluate the level of credibility of the source and the willingness of the source to communicate unbiased and accurate information (Kelley, 1967; Eagly and Chaiken, 1975; Mizerski, Golden and Kernan, 1979; Kirmani and Rao, 2000). As discussed earlier, the credibility of first-party sources – the producers signaling about themselves – is generally lower than that of third party sources (Mizerski, Golden and Kernan, 1979; Dean and Biswas, 2001; Higgins and Gulati, 2003). Supporting this argument, Gemser, Leenders and Wijnberg (2008) found empirical evidence supporting the claim that more credible

third party sources more strongly influence buyers' purchase decisions. One way to understand this is by considering the separating equilibrium, in the sense of Spence (1973), which is created when a third party source conveying a signal about a producer is perceived to be highly credible and hence, thought not to jeopardize this position by signaling about producers of inferior quality (Bergh, Connelly, Ketchen and Shannon, 2014; Higgins and Gulati, 2003; Ippolito, 1990). Expert buyers are aware of the costs third party sources bear in transmitting signals<sup>32</sup>; and they will therefore consider it less likely that highly credible sources will transmit false or biased signals (Bergh, Connelly, Ketchen and Shannon, 2014; Higgins and Gulati, 2003; Ippolito, 1990).

Thus, in markets in which the source credibility levels of third parties are different, ranging from high to low, we argue that expert buyers pay more attention to highly credible third party sources transmitting signals of a certain kind as opposed to third party sources of lower credibility conveying the same kind of signals, and this can be observed by the number of sales and price paid in the year succeeding the year in which the signals appear. Thus, we propose:

*H2a: In a given year, the higher the credibility level of third party sources transmitting signals of a particular kind about a producer, the greater the number of sales to expert buyers in the subsequent year.*

*H2b: In a given year, the higher the credibility level of third party sources transmitting signals of a particular kind about a producer, the higher the price paid by expert buyers in the subsequent year.*

### 3.2.4 Number of signals and the moderating role of source credibility

Referring to our arguments in the previous sections, we expect that in markets characterized by high uncertainty a high number of signals and high credibility of the sources transmitting those signals will positively affect the purchase decisions of expert buyers. Specifically, we expect that these two arguments will also strengthen each other. The reasoning is straightforward: As reviewed earlier, signals conveyed by third party sources are common in markets with informational deficiencies about producers' quality. However, with a wide variety of different kinds of signals originating from different sources with different levels of credibility, it is highly probable that expert buyers will not consider all available information about all producers in their choice set but look for shortcuts that ease the burden of making comparisons by transforming quantities and qualities of this information into a common metric (Espeland & Stevens, 1998). Heterogeneous and multidimensional information provided by many signals and their source credibility dimension can be combined into a so called gestalt metric in which "the whole is greater than the sum of the parts" (Koffka, 2013), making it possible to form judgments based on information provided by quantitative dimensions of the signals and the qualitative dimensions of the signals' sources.

<sup>32</sup> Cost can be understood in terms of reputation loss caused by transmitting biased signals and/or costs involved in transmitting a signal.

We argue that in markets with imperfect and incomplete information about producers' quality, expert buyers pay attention to both a high number of signals of a certain kind and a high level of source credibility. In a general sense, such stable and shared evaluations reinforce one another and give expert buyers' additional confidence of producers' high quality. Specifically, any accountability concerns expert buyers may have related to post purchase quality are reduced because of the conservative nature of their purchase decision, which can be shown to be based on the opinions of many highly credible sources.

Thus, in markets in which the available signals originating from third party sources are of different kinds and originate from different third party sources with different levels of credibility, which may differentially affect sales to expert buyers, we argue that there is a positive association between a high number of signals of each kind together with high credibility levels of third party sources transmitting those signals about producers in a particular year and sales in the following year. Therefore, we propose the following hypotheses:

*H3a: In a given year, the greater the number of signals of a particular kind originating from third party sources and the higher the credibility level of these sources transmitting signals about a producer, the greater the number of sales to expert buyers in the subsequent year.*

*H3b: In a given year, the greater the number of signals of a particular kind originating from third party sources and the higher the credibility level of these sources transmitting signals about a producer, the higher the price paid by expert buyers in the subsequent year.*

### 3.2.5 Expert buyers and past sales

Decision-making based upon observing the choices of others (Banerjee, 1992) or converging to uniform social behavior is known as herd behavior (Bikhchandani et al., 1998), and has been studied in a variety of empirical settings, e.g., investments decisions on the stock market (Cipriani and Guarino, 2014), investments decisions in IT (Kauffman and Li, 2003), on-line auctions (Dholakia, Basuroy, and Soltysinski, 2002), retailing (Hui, Bradlow, and Fader, 2009) and digital retailing (Chen, Wang, and Xie, 2011). This type of behavior can arise through "rational processing of information gained by observing others" known as observational learning (Bikhchandani, Hirshleifer, Welch, 1998, p. 153). To overcome uncertainties caused by informational deficiencies, observational learning theory suggests that individuals may follow the actions of other individuals when they are able to observe them (Bandura, 1977).

Herd behavior can arise in different situations, one of which is a decision-making context where there are observable signals to facilitate comparison among competitors, but buyers forgo this information and choose to follow the purchase decisions of others instead (Banerjee, 1992; Bikhchandani et al., 1992; Bikhchandani, Hirshleifer, Welch, 1998). For instance, Salganik and Watts (2009) found that rankings, e.g., *New York Times* bestseller lists or *Billboard* music charts, announcing the popularity of a particular producer positively affect the economic performance of that producer by increasing their popularity to a broader customer base. These authors

empirically demonstrated that socially constructed segmentation mechanisms aid in influencing the purchase decisions of those observing them, both on an individual and collective level (Salganik and Watts, 2009). Similarly, Salganik, Dodds and Watts (2006) found, in the empirical setting of music downloads, that the extent to which buyers can directly observe the purchases of other buyers influences their purchase decisions. Most research on herd behavior focuses on uninformed buyers; nevertheless, these studies clearly demonstrate that past purchases of buyers act like signals of quality if they are observable to others.

In markets characterized by high uncertainty about quality because of imperfect and incomplete information, we argue that it is also reasonable to assume that expert buyers engage in observational learning to reduce uncertainty and perceived risk. This category of buyer often has similar expectations about quality as their peers; and these expectations can be strongly influenced by the social dynamics of members in the focal network. It is probable that expert buyers' networks can also be characterized as being "small world" (Milgram, 1967) because of high level clusters, in which individuals in the network either know one another directly or are connected through someone else (Milgram, 1967; Uzzi and Spiro, 2005). Earlier studies have shown that connectivity between clusters helps spread new information, which can strongly influence the behavior of both individual members and the group (Granovetter 1973; Frank and Yasumoto 1998; Moody and White 2003). We argue that in highly clustered networks, where past purchases of members are also observable to other members of the focal network, producers' past sales will function as a signal of quality.

Thus, in markets with high uncertainty about producer quality and where past purchases of expert buyers are observable to other expert buyers, we argue that in a particular year expert buyers pay attention to purchases made by other expert buyers, and this can be observed by the number of sales and price paid in the succeeding year. Therefore, we propose:

*H4a: In a given year, the greater the number of sales, the greater the number of sales to expert buyers in the subsequent year.*

*H4b: In a given year, the greater the number of sales, the higher the price paid by expert buyers in the subsequent year.*

## 3.3 EMPIRICAL SETTING

### 3.3.1 Primary market for contemporary visual art

The contemporary art market is comprised of a network of artists, gallery owners, curators, museum directors, auction houses and art collectors. Determining the quality of contemporary artworks is notoriously difficult because there are no objective measures for comparison (Caves, 2000); and aesthetic evaluations as alternative measures are highly subjective and largely uninformative (Yogev, 2010). In this market, third party sources are particularly important in helping to reduce uncertainty because the signals these sources transmit function as proxies of quality; that both reflect and help constitute the reputation of an artist (Hirsch 1972; Ertug, Yogev, Lee and Hedstrom, 2015; Velthuis, 2003; Caves, 2000; Prinz, Piening and Ehrmann, 2015).

There are many buyers active in the contemporary visual arts market, of which the main categories are: museums, private collectors and corporate collectors. This study focuses on the latter category for two reasons: First, corporate collectors are predominantly active on the primary art market (Wu, 2002), where artworks are bought for the first time (Singer and Lynch, 1994). This reliance on the primary market means there are no additional factors, such as provenance of an artwork, which can also act as a signal. Second, corporate collectors are a homogenous group of expert buyers who are well educated and actively search for information. It can be assumed that they are aware of the signals we analyze in this study. Third, the size of the group makes it possible to collect data about a sizable part of this submarket; in fact, the data of this study cover 77% of all sales to corporate collections in The Netherlands (NL).

### 3.3.2 Prestigious art residency

We study the career trajectories of alumni of the Rijksakademie van beeldende kunsten (RABK), who are visual artists mostly active in the primary art market and to a lesser extent at art auctions. RABK alumni are held in high esteem by the international art community, as can be measured by the number of exhibitions at prestigious museums, e.g., Tate Modern, London and MOMA, New York City, international art exhibitions, e.g., Venice Biennale, Venice and Documenta, Kassel, and art fairs, e.g., Art Basel in Basel, Miami and Hong Kong and Frieze in London. Notwithstanding some differences in talent and abilities, the RABK alumni can be generally regarded as a relatively homogenous cohort of visual artists who work in the upper echelon of the international art community. This is because RABK invests heavily in talent scouting and development, which starts with a rigorous selection process. In accordance with RABK goals, the selection committee, consisting of prestigious peers as jury members, selects based upon the potential talent of visual artists to allow them to further develop and deepen their visual art practice work ([www.rijksakademie.nl](http://www.rijksakademie.nl)).

RABK has a long history of excellence; it was established in 1870 by King Willem III as a classical art academy, focusing exclusively on teaching, both the technical and creative aspects of fine art disciplines, e.g., painting, drawing, and sculpture. From this time period to the late 1980s, eminent RABK graduates include: Jan Toorop, Berlage, Breitner, Piet Mondrian, Constant, and Karel Appel ([www.rijksakademie.nl](http://www.rijksakademie.nl)).

Commencing in the late 1980s, RABK began to transition from being a classical art academy to becoming a two-year artists' residency program, in which the focus from teaching art skills shifted to conducting artistic research. As a residency program, RABK provides selected artists the unique opportunity to focus on artistic experimentation, innovation and critical discourse. The goal of this program is to select the most talented visual artists and offer them a platform where research, experimentation, innovation and critical discourse are central, and complemented with technical facilities, workshops, podia for artistic presentations and networking opportunities (Rijksakademie Annual Report, 2014).

Since the late 1980s, there has been a steady increase in the number of visual artists applying to the residency program and the number of foreigners accepted. For instance, in 1990, 25 out of 368 visual artists who applied were accepted, and of the accepted applicants more than half were Dutch. While in 2008, 27 of the 1,415 artists who applied were accepted, and more

than two-thirds came from other European countries as well as Asia, Africa and North America. The average age of an accepted applicant is 29 years old, and more than 95% have received a bachelor and/or master degree in fine arts or in a related discipline and have had between two to five years art practice experience. RABK does not offer an academic degree upon finishing the residency program but it does offer financial support and studio space so that residents can devote the two years of their residency to developing their art practice.

### 3.3.3 Corporate art collectors

Corporate collectors can be understood to be any business engaged in commerce, and who also collect art, but whose core activity is not preservation, research and communication of works of contemporary visual art (Weil 1990). Corporate collectors have convergent roles of setting the standards for recognizing and attributing value in the visual arts (Balfe 1987; Martorella 1990; Wu 2002). Although historically museum collections have played a role in determining art value based upon what art became institutionalized, since the 1980s corporate art collections have steadily gained credibility and authority to also determine the value of art (Wu 2002). Most corporate art collections have been initiated by the corporate elite such as the CEO or senior partners (Wu 2002), implicitly or explicitly reflecting the culture and aims or ambitions of the company (Caves 2000), and mostly formed under the auspices of art experts (Wu 2002; Martorella 1990). The expert buyers who are employed by these corporations, and buy art on their behalf, usually have advanced degrees in art history and extensive curatorial museum experience. These expert buyers also move freely between building public, semi public and private collections (Martorella 1990). In doing so, they have helped legitimize many corporate collections authenticating them to museum art standards (Wu 2002). In the Netherlands, most organizations<sup>33</sup> that, in addition to their core business activities also collect art, are members of the Netherlands Association of Corporate Art Collections (VBCN) ([www.vbcn.com](http://www.vbcn.com)); expert buyers whose buying behavior is studied in this paper are all employees of organizations that are members of this association.

## 3.4 EMPIRICAL STRATEGY

### 3.4.1 Model

We use Poisson regressions with cohort fixed effects, robust standard errors clustered at the artist level for possible non-independence across same artist observations, and artistic discipline fixed effects. As discussed by Santos Silva and Tenreyro (2006, 2011) Poisson regressions provide consistent estimates even when the dependent variable is not an integer. All that is needed is correct specification of the conditional mean, which is assumed here to be log-linear. An important advantage of the Poisson pseudo Maximum Likelihood estimator<sup>34</sup> is that it accommodates the case of a dependent variable with many zeros.

<sup>33</sup> ABN AMRO, Ahold, AkzoNobel, DNB Bank, DSM, KPMG, OCE and RaboBank are examples of some of the VBCN members.

<sup>34</sup> We use the Stata code `ppml` to estimate Poisson regressions by pseudo maximum likelihood; this code differs from the Poisson command in Stata because it uses the method of Santos Silva and Tenreyro (2006; 2010) to identify and drop regressors that may cause the nonexistence of the (pseudo-) maximum likelihood estimates.

Furthermore, we supplement the coefficient estimates with standard errors clustered at the artist level. The sign of the coefficients is equal to the sign of their marginal effects. The marginal effects, however, depend on the value of the regressors due to the nonlinearity of the Poisson regression model.

*The resulting estimated regression specification is:*

$$s_{it} = \beta_{REVIEWS} REVIEWS_{i,t-1} + \beta_{AWARDS} AWARDS_{i,t-1} + \beta_{AFFILIATIONS} AFFILIATIONS_{i,t-1} + \beta_{PAST SALES} PAST SALES_{i,t-1} + \gamma' w_{it} + \varepsilon_{it}, \quad (1)$$

where the dependent variable is sales for artist  $i$  in year  $t$  (labeled  $S_{it}$ ) and the main regressors of interest are reviews, awards, and gallery affiliations; a variable for sales for artist  $i$  in year  $t-1$  is also included;  $w$  represents a vector of control variables described more fully below. As stated before, sales can be measured by count (number) or average price, while each kind of signals can be quantified as count (number) or the level of credibility of third parties, calculated as a yearly average. The vector of control variables varies over specifications. A description of the variables is provided in the next section.

### 3.4.2 Variables

RABK tracks the careers of their alumni; we received these raw data consisting of reviews, award records, listings of exhibitions and art fairs, and gallery information for all 471 alumni from 1986 to 2012. Thus, we have a complete sample of all alumni.

Upon retrieval, we first, verified these data by checking artists' *curricula vitae* (CV) on their websites. The verification process, conducted through the Internet, took place from September to December 2012. Most artists use their CV to provide a comprehensive listing of their professional history, including art education, and achievements, such as awards, reviews and gallery affiliations. Second, we cross-validated these data for accuracy by checking art market news platforms such as *artnet.com* and *artfacts.com*, and collecting sales data from corporate art collections. This resulted in a unique and very comprehensive dataset.

We then constructed a panel dataset. The dimension of the panel data are  $T=22$  time periods (1990-2012) and  $N=471$  artists. We code sales and signals as zero in years without a registered event. Hence, we assume that the individual was still active in those years. Also we assume that all artists have been active until 2012, i.e. the last year in our data. Furthermore, we code sales and signals as not available for years before the start of the career, as defined as the starting year of the first art education. It should be noted that this makes the panel data highly unbalanced, i.e. the average number of available time periods per individual is 15. The minimum is 5 (cohort of 2008) and maximum is 22 periods (first year of collecting data).

#### 3.4.2.1 Sales

Our dependent variables are the quantity of sales and the price paid in euros. The quantity is simply the total number of sales to corporate collectors for an artist in a particular year. The price<sup>35</sup> is defined as total euro amount of sales divided by the number of sales in a given year.

<sup>35</sup> Our results are substantively the same if we use maximum price in a year as compared to average price as the dependent variable; these results are also robust if we transform our dependent variable into a binary variable, measuring if a sale was made in a given year or not.

These data were collected from 22 corporate art collections in the Netherlands (out of 35) who participated in our study. These corporate collectors account for 77% of the sales made to all corporate collections in the Netherlands during our observation period ([www.vbcn.com](http://www.vbcn.com)).

#### 3.4.2.2 Past performance and signals

Our four explanatory variables are past sales (both quantity and average price depending upon the dependent variable), reviews, awards and gallery affiliations. First, including past sales as an explanatory variable allows us to gain a deeper understanding of persistence of performance across artists. We include one-year lagged sales to measure the impact of past performance on current performance (Waguespack and Salomon, 2015). By including these variables we implicitly control for individual unobserved heterogeneity, and reduce omitted variable bias. Second, for each kind of signal we construct a variable measuring the total number of signals in a given year. We also created a variable measuring the average credibility score of sources issuing a particular kind of signal in a year. The credibility of third party sources was determined by two independent art experts and one of the authors based on a validated scale measuring the source credibility construct (discussed in the next section). If an artist did not receive a particular kind of signal in a given year, then a zero was given for both variables. The granularity level of these data is annual; to avoid problems due to reverse causality, we only include the one-year lagged signals as predictors and not their contemporaneous values.

These explanatory variables are operationalized as follows: Reviews are either in art journals or national/ international newspapers and are broadly interpreted as anything from a discourse about an artist's oeuvre to critiquing national and international exhibitions. In the contemporary visual arts, the chance of a particular product or producer being reviewed is much smaller than in other creative industries, e.g., movies (e.g., Eliashberg and Sujan, 1997; Basuroy, Chatterjee and Ravid, 2003) or books (Berger, Sorensen, and Rasmussen, 2010); and of the art critics who do review selected exhibitions, 9 out of 10 give positive reviews (see: *The Visual Arts Critic: A Survey of Art Critics at General Interest Publications in America*, New York: National Arts Program - Columbia University, 2002; Elkins, 2003). Based on this previous research, we do not control for the valence of reviews, nor of the other signals discussed below, as neither awards nor affiliations can ever be considered to express anything but positive valence.

Awards range from Dutch national art awards such as the *Prix de Rome* to internationally recognized art awards such as the *Turner Prize* (arguably Britain's most visible award for contemporary visual artists). Although jury members and critics can derive reputational benefits, e.g., being the first to discover a new star talent, from the awards they bestow and reviews they write, a gallery owner is often not only exclusively interested in the artistic contribution and potential of the artist but also in the evolving art market and financial gains to be made. As such, gallery owners are both promoters and service providers because they select artists, monitor their professional development and convey signals about them to the public, while also selling the artworks to art collectors (Velthuis 2003). One of the strategies an art gallery can use to promote artists is to attend annual art fairs. *Art Basel*, *Frieze*, and *Artissima* are examples of international art fairs that provide selected art galleries a platform to exhibit artists and to sell

artworks to collectors as well as promote these artists to museum representatives, curators and art critics (Yogev and Grund, 2012). We operationalize affiliation as an artist's association with a gallery at an art fair. Earlier research has shown that affiliations signal quality (e.g., Jensen 2003) by the suggestion to buyers that the producer is worthy of the association (Khaire 2010).

#### 3.4.2.3 Measuring credibility of third party sources

Using a multi-item and validated scale underlying the source credibility construct (Ohanian, 1990), we scored the credibility level of 967 third parties sources. Initially, we were concerned that the sheer number of sources to rate could overwhelm and negatively affect our expert panel of judges, therefore, similar to Stanford et al. (2002), we first took a sample of 200 sources and asked three well-informed judges to rate these sources on a six items scale using a 5 point Likert measurement to measure the credibility level of third party sources in our sample. The six items were: trustworthiness, honesty, dependability, experience, expertise and how knowledgeable a source is (Ohanian, 1990). If a judge did not know the source and could not provide a rating based upon a quick Internet search, then 'do not know source' option could be checked. Two art experts, each with more than 18 years of experience in the field, served as judges; the third judge is one of the authors.

The internal validity of the six items measured was high, with a Cronbach's alpha of .98. Interrater reliability was calculated by using an intraclass correlation coefficient (ICC), specifically a two-way random effects model (Shrout and Fleiss, 1979). This resulted in an intraclass correlation (ICC 2,3) of .744 and significant at the .001 level. This indicates the judges' ratings to be internally consistent, which suggests low random and specific errors (Bravo and Potvin, 1990). Based upon the construct's high internal validity and internal consistency between judges, the third judge continued rating the remaining 767 sources.

#### 3.4.2.4 Control variables

In addition to the explanatory variables described above, we include a number of control variables. First, we included a lagged dummy variable, which is coded 1 if an artist did not receive a signal in a particular year and the corresponding credibility level was coded 0; otherwise if the artist did receive a signal of a particular kind, this dummy variable is coded 0. Initially, we created dummy variables for each kind of signal, each equaling 1 when the corresponding credibility level was 0. However, the correlation between these dummy variables and the signal count variables as well as the source credibility level variables was high: between -0.73 and -0.96. One way to reduce collinearity is to impose an equality of coefficients restriction. The F test statistic, which is robust to multicollinearity, was used to verify equality. Imposing this restriction lead to creating a new dummy variable, as described above, which we lagged one year. This dummy variable controls for not receiving a signal in a given year but it also represents the impact of an individual going from no signals (review, award, affiliation) in a previous year to receiving at least one signal in the following year; thus, reflecting possible non-linear effects of receiving at least one signal. Given the many zero observations in these data, accounting for this effect is warranted.

Second, we construct a set of dummy variables to measure the effect of being in the same cohort (Merluzzi and Phillips, 2015) and to control for years since completion of the

RABK residency. Furthermore, we create binary indicators for gender (1 equals female) and nationality (1 equals Dutch) and for each of six artistic disciplines: drawing, installation, painting, photography, sculpture, and video-film. Miscellaneous, a basket category for other disciplines, e.g., graphics, book making, is the base.

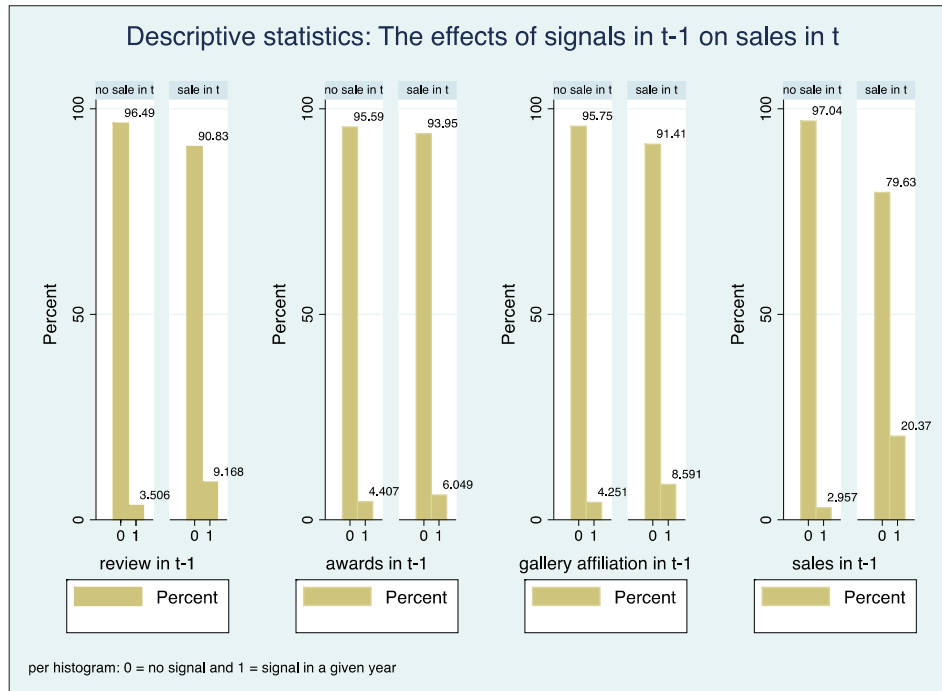
#### 3.4.3 Estimation

The unit of observation is the individual artist in a particular year. Given the longitudinal nature of our data ( $T=22$ ), there may be serial correlation embedded in the error term. We control for these with cohort fixed effects and artistic discipline fixed effects, although we note that, for example, Greene (2007) suggests that fixed or random effects may be used to account for serial correlation. However, in our application, we argue that neither fixed nor random effects are appropriate for two reasons: First, as mentioned earlier, 31% ( $n=147$ ) of the artists in our sample have had a sale to a corporate art collector. This means that there is no variance in sales within the rest of the artists (i.e., those who have no sales) in our sample. Under such conditions, using fixed effects specification causes sample selection bias, because only artists with positive sales are analyzed. Effectively, using fixed effects we lose information about the other artists without sales, which is valuable information because it adds to the explanation of sales in general based on the values of artists' signals and other individual characteristics, especially considering that all artists try to sell their artworks. Second, although some literature suggests using random effects in models with little variance in the dependent variable caused by many zeros (see: Waguespack and Salomon, 2015), this is problematic in dynamic panel data models because the random effects correlate with the included lagged dependent variable regressor and lagged independent variable regressor, which may lead to endogeneity problems (Wooldridge, 2010). The literature also suggests correlated random effects (CRE) models, which are efficient for static models, allowing for unobserved heterogeneity to be correlated with observed covariates and selection mechanisms (Wooldridge, 2010), however, the strict exogeneity of the covariates is restrictive and cannot be extended to dynamic models. Instead, as noted above, we control for unobserved heterogeneity by including cohort fixed effects and discipline fixed effects.

#### 3.4.4 Summary statistics

In the period 1990 up to and including 2012, we observe 732 sales to corporate collectors, 2956 reviews, 676 awards and 335 gallery affiliations. As noted above, getting reviewed occurs more frequently than selling. This may be indicative of the primary art market where there is an oversupply of artists and uncertain demand (Caves, 2000). The majority of the 471 artists in our sample receive at least one review (399) or award (281) during their two-year residency at RABK or thereafter. However, there are only 146 artists who ever sold anything to corporate collectors and only 132 have a gallery affiliation. The result is an abundance of zero observations in the data. In our data the maximum price paid for an art work sold to a corporate collector is € 120,000 and the minimum is € 313 with a mean price of € 4786. With respect to the signals, the average score for 'review credibility' is 3.24 on a 1 (low credibility) to 5 (high credibility) scale; the average 'award credibility' is 2.70, on a 1 (low credibility) to 5 (high credibility) scale; and the average 'affiliation credibility' is 2.89 on a 1 (low credibility) to 5 (high credibility) scale.

FIGURE 3.1



We foreshadow our estimation results, by first looking at general patterns in the data. Figure 3.1 shows the probability of having a sale in year t if a signal is received in t-1. For instance, if a producer receives a review in a given year then the probability that the producer will have a sale in the following year is 9.2%, compared to not receiving a review last year, in which the probability of a sale in the following year is 3.5%. We observe a similar pattern across all signals if producers receive a signal in t-1, specifically: the probability of a sale in t if a producer receives a signal in t-1 is 6.1% for awards, 8.6% for gallery affiliations and 20.4% for past sales, compared to not receiving a signal in t-1 than the likelihood of a sale in t drops to 4.4% for awards, 4.2% for gallery affiliations and 3.0% for past sales.

### 3.5 RESULTS

#### 3.5.1 Explaining sales and sales price by signal counts

In this first part we measure signals (*reviews*, *awards* and *affiliations*) in equation (1) with their counts only. We analyze the effects of signal counts on two outcome variables, i.e. sales count and average price. Table 3.1 presents the PPML estimation results for the sales count.

TABLE 3.1 Explaining sales counts by lagged signal counts

	(1)	(2)	(3)	(4)
LAGGED REVIEWS	0.215** (0.023)	0.123** (0.027)	0.133** (0.029)	0.128** (0.033)
LAGGED AWARDS	0.434** (0.122)	0.346** (0.142)	0.358** (0.137)	0.377** (0.141)
LAGGED AFFILIATIONS	0.417** (0.097)	0.392** (0.091)	0.489** (0.098)	0.443** (0.112)
LAGGED SALES COUNT				0.303** (0.034)
N	8918	8918	8918	8918
Control Variables	No	Yes	Yes	Yes
Discipline FE	No	Yes	Yes	Yes
Cohort FE	No	No	Yes	Yes
BIC	5449	4736	4803	4562

Clustered standard errors in parentheses  
 FE – fixed effects  
 \* p<0.10, \*\* p<0.05

These results show that impact of signals on sales is positive, with a similar magnitude across the four specifications (even when no control variables are used). Furthermore, there is significant effect of lagged sales on sales in the subsequent period. As can be seen in column 4, adding lagged sales to an improved (lower) value of the Bayesian Information Criteria (BIC), a test for comparing the explanatory power of nested models, suggesting that lagged sales should be included in our model. Stated alternatively, model 4 is the most appropriate model for the sales count data and will be used in further analysis below.

Table 3.2 presents estimation results using the average price as dependent variable. As compared to the model of sales count, the estimates of the coefficients show some variation across the models, but primarily for the measure of lagged awards which is not significant at the p<0.05 level. For price, as with sales count, model 4 has the lowest value of BIC and should be used for interpretation of our results. As can be seen in the results for model 4 in Table 3.2, in addition to the past year's average sales price, both lagged reviews and lagged affiliations are significantly associated with the average price paid.

**TABLE 3.2** Explaining average sales by lagged signal price

	(1)	(2)	(3)	(4)
LAGGED REVIEWS	0.257** (0.019)	0.162** (0.028)	0.190** (0.027)	0.178** (0.027)
LAGGED AWARDS	0.301* (0.182)	0.075 (0.261)	0.119 (0.212)	0.194 (0.214)
LAGGED AFFILIATIONS	0.364** (0.100)	0.190 (0.170)	0.265* (0.153)	0.300** (0.136)
LAGGED SALES PRICE				0.032** (0.006)
N	8918	8918	8918	8918
Control Variables	No	Yes	Yes	Yes
Discipline FE	No	Yes	Yes	Yes
Cohort FE	No	No	Yes	Yes
BIC	17046	15532	14751	14486

Clustered standard errors in parentheses  
FE – fixed effects  
\* p<0.10, \*\* p<0.05

Our first set of results show that there is a robust positive correlation between the two dependent variables--the number of sales and the price paid--and the occurrence of signals in the previous year. Table 3.1 provides evidence to support hypothesis 1a. In count data models, such as Poisson, a regression coefficient measures the relative change in the conditional mean of the outcome variable if the corresponding regressor changes by one unit (Cameron and Trivedi, 2005) Therefore the magnitude of the coefficients can be directly compared, as all variables are counts. For example, in Table 3.1, Model 4 the relative change in the number of sales caused by the number of sales in the previous year is 0.30, while it is 0.13 for reviews, 0.38 for awards and 0.44 gallery affiliations. This suggests that awards and gallery affiliations are most important for sales followed by past sales, while reviews are least important. The results from Table 3.2 provide evidence to support hypothesis 1b, except that awards are not significantly associated with the sales price.

As noted above, in Table 3.1 and Table 3.2, we exploited Bayesian information criterion (BIC) as a model selection statistic for nested models. In both tables, Model 4 had the lowest BIC, indicating that this model, as compared to the other three models, is the one most likely to have generated the observed data. In Table 3.3 and for the remainder of the paper, we continue reporting only the results from Model 4, which includes lagged sales, control variables, discipline FE and cohort FE.

### 3.5.2 Explaining sales and sales price by source credibility

Given the positive association between quantity of past signals and quantity (or average price in the price equation) of past sales on both sales count and price, we now analyze the credibility dimension of the third party sources transmitting the signals (*reviews*, *awards* and *affiliations*) in equation (1). We perform similar regressions as before, predicting sales count and average price, but now we include as explanatory variables the level of credibility of third party transmitting different kinds of signals instead of the count. If an artist has more than one signal of a certain kind in a year, than the variable is measured as the average value of credibility for that signal in the year. Table 3.3.1 presents the PPML estimation result per model for sales count and average sales price.

**TABLE 3.3.1** Explaining sales count by lagged sales credibility

	(1)
LAGGED REVIEWS	0.076* (0.046)
LAGGED AWARDS	0.185** (0.045)
LAGGED AFFILIATIONS	0.182** (0.065)
LAGGED SALES COUNT	0.292** (0.032)
N	8918
Control Variables	Yes
Discipline FE	Yes
Cohort FE	Yes

Clustered standard errors in parentheses  
FE – fixed effects  
\* p<0.10, \*\* p<0.05

**TABLE 3.3.2** Explaining sales price by lagged sales credibility

	(1)
LAGGED REVIEWS	0.205** (0.079)
LAGGED AWARDS	0.126* (0.076)
LAGGED AFFILIATIONS	0.180* (0.102)
LAGGED SALES COUNT	0.035** (0.007)
N	8918
Control Variables	Yes
Discipline FE	Yes
Cohort FE	Yes

Clustered standard errors in parentheses  
FE – fixed effects  
\* p<0.10, \*\* p<0.05

In Table 3.3.1 shows a positive association between signal transmitted by highly credible third party sources in a given year and the number of sales in the subsequent year. These results provide evidence to confirm hypotheses 3a. Similar effect sizes of awards and affiliations: 0.18 and 0.18, respectively, indicate that expert buyers are influenced by highly credible third party sources transmitting these signals, while highly credible third party sources conveying reviews seem to have a slightly lesser effect on this category of buyers. The results from Model 1 in Table 3.3.2 indicate a strong positive correlation between reviews transmitted by highly credible third party sources, 0.20, in one year and the price paid in the following year followed by affiliations and awards, 0.18 and 0.12, respectively. Hypothesis 3b is also confirmed.

### 3.5.3 Explaining sales and sales price by signal counts moderated by source credibility

To estimate the interaction effects between number of signals and the source credibility, we follow the procedure described in Dhar and Weinberg (2016) and Ai and Norton (2003). These papers show that nonlinear models inherently include interactions among the variables, so that specific interactions terms do not need to be added to the model unless justified by theory and supported by statistical results<sup>36</sup>. The validity of this argument is based on the definition of the interaction effect as the 'cross partial' derivative of the dependent variable y on the two (in their example) independent variables, x and z. The argument is based on the idea that in most nonlinear models the cross partial depends on the values of both x and z, hence even without an explicit interaction term xz it is a function of both x and z values.

In the data the minimum and maximum number of reviews is 0 and 17, but 85% of the data concerns 0, 1, or 2 reviews only. For awards and gallery affiliations more than 95% of the data concerns 0, 1 or 2 signals only. We therefore evaluate the mean predicted sales (or average price) for signal count equal to 0, 1 or 2. Regarding the source credibility dimension, we choose zero, low, medium or high levels. Medium level is just the sample mean, while low and high levels are defined as one standard deviation below and above the sample mean respectively. We show the results as the number of signals increases within a representative source credibility range.

FIGURE 3.2 Estimating sales count: A counter-factual experiment

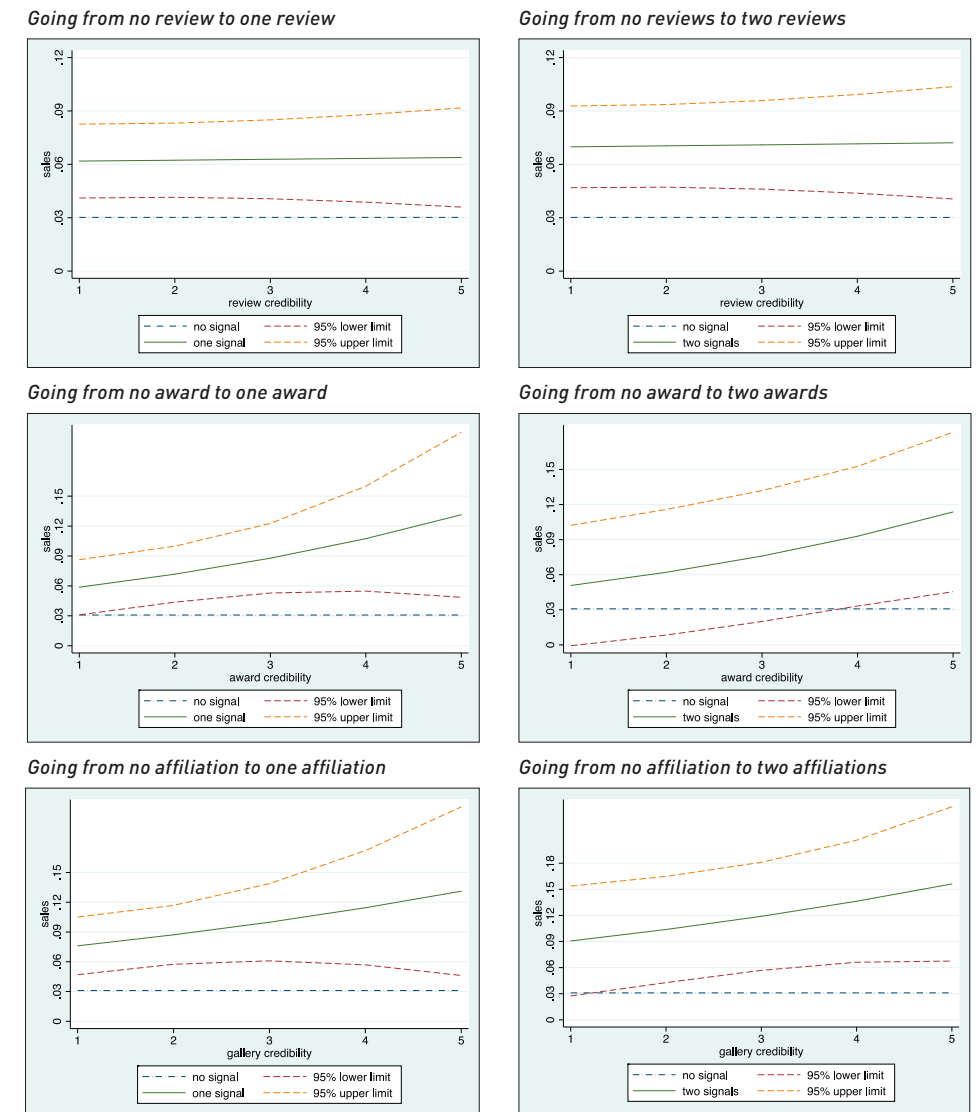


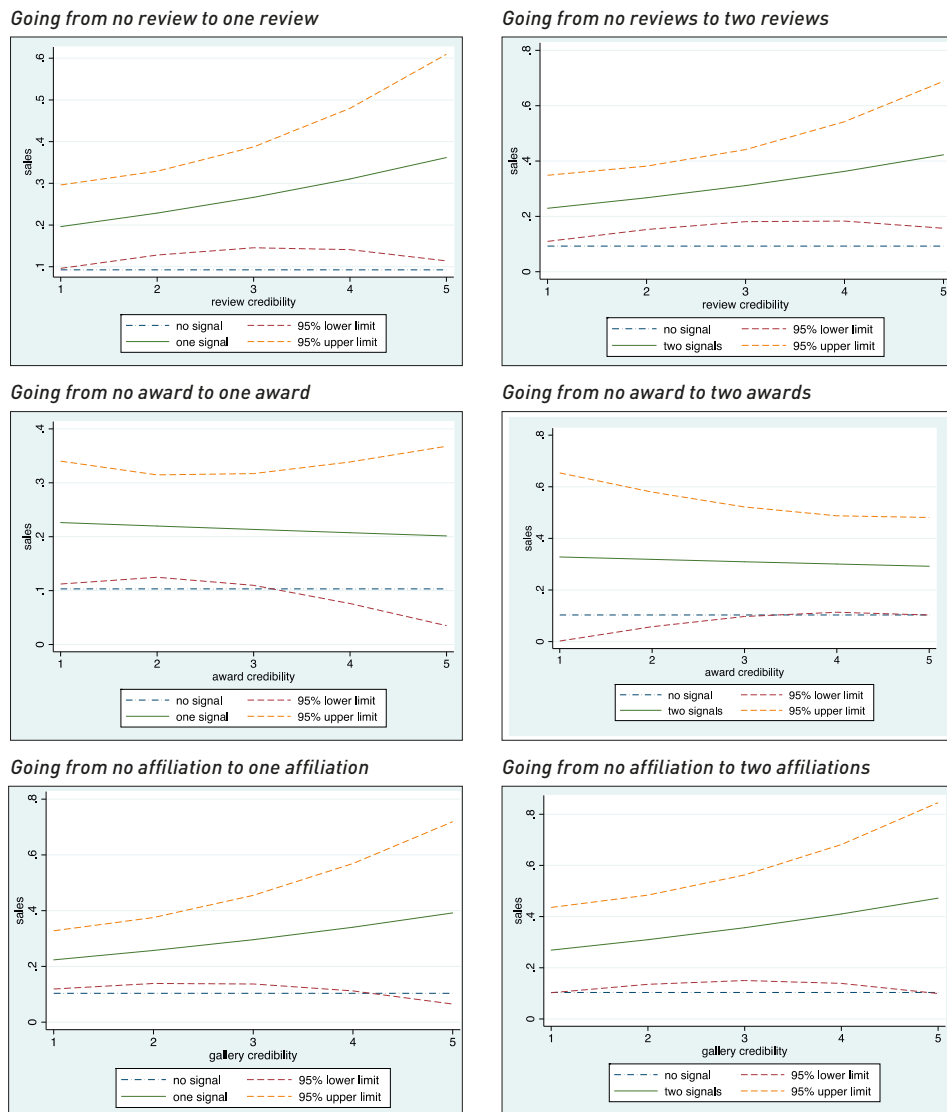
TABLE 3.4 Explaining sales count by signal count and source credibility level: A counter-factual experiment

	REVIEWS	AWARDS	AFFILIATIONS
NO SIGNAL	0.031	0.031	0.031
ONE SIGNAL LOW CRED	0.062	0.059	0.076
TWO SIGNALS LOW CRED	0.070	0.051	0.091
ONE SIGNAL MED CRED	0.063	0.088	0.100
TWO SIGNALS MED CRED	0.071	0.076	0.119
ONE SIGNAL HIGH CRED	0.064	0.131	0.131
TWO SIGNALS HIGH CRED	0.072	0.114	0.156

<sup>36</sup> Our results from BIC model selection statistic showed the overall fit of the model without the interaction terms was better than the fit of the model with an interaction term included, thus supporting our use of the model without explicit interaction terms.



**FIGURE 3.3** Estimating sales price in € (x1000): A counter-factual experiment



**TABLE 3.5** Explaining sales price by signal count and source credibility level: A counter-factual experiment

€ (x1000)	REVIEWS	AWARDS	AFFILIATIONS
NO SIGNAL	0.103	0.103	0.103
ONE SIGNAL LOW CRED	0.196	0.226	0.223
TWO SIGNALS LOW CRED	0.229	0.328	0.270
ONE SIGNAL MED CRED	0.266	0.213	0.296
TWO SIGNALS MED CRED	0.311	0.309	0.356
ONE SIGNAL HIGH CRED	0.362	0.201	0.392
TWO SIGNALS HIGH CRED	0.422	0.292	0.472

Table 3.4 and Figure 3.2 presents our results that show a general pattern indicating that a higher number of signals, i.e., reviews, awards, and affiliations, have a greater effect on sales count, and this effect increases as the credibility level of the third party source issuing the signal increases, with the exception of reviews, where the credibility appears not to have an impact. Greene (2010) advises to graphically show the effect in nonlinear models, because the interpretation is difficult. When we graphically plot the interaction effects, with their corresponding confidence intervals, we find that for reviews: going from 0 to 1 or from 0 to 2 reviews in a given year has a statistically significant influence on sales count in the following year. For awards: going from 0 to 1 is statistically significant for a source credibility level of 1.5 and higher. The upward slope indicates that the higher the source credibility of the award in a given year, the greater the number of sales the artist has the next year. The plot shows an upward slope when going from 0 to 2 awards; however, this is not statistically significant unless the awards are from highly credible sources. For gallery affiliations: going from 0 to 1 or from 0 to 2 affiliations in a given year has a statistically significant effect on sales count in the following year. In summary, for all signals an increase from 0 to 1 or from 0 to 2 in count shows a monotonic increase in function in relation to higher source credibility. The greater the number of signals originating from highly credible third party sources received in a given year, the greater the number of sales in the subsequent year. Hence hypothesis 3a is confirmed.

Examining the results for sales price in Table 3.5 and Figure 3.3, we see that having one signal as compared to no signal or two signals as compared to no signals in a given year at the mean level of credibility of third parties transmitting each kind of signal has a statistically significant effect ( $p > 0.05$ ) on the sales price in the subsequent year. For both reviews and affiliations, the difference between the sales price at the high credibility level (.422 for reviews, .472 for gallery affiliations) at the level of two signals as compared to the sales price at low credence (.229 for reviews, .279 for affiliations) are statistically significant. The differences are also statistically significant for one review (affiliation) signal at the high credence level as compared to the low credence level. For awards, however, perhaps surprisingly, the credence level does not appear to have an impact on the sales price. Hence, hypothesis 3b is supported for reviews and affiliations, but not for awards.

### 3.5.4 Explaining sales and sales price by past sales

The results in Table 3.1 Model 4 show that the number of past sales has a positive significant effect on sales count, thus confirming hypothesis 4a. Model 4 in Table 3.2 shows a positive significant association between the number of past sales the average sales price in the previous year and average sales price in the subsequent year; hypothesis 4b is confirmed. Although not the main focus of our study, in the discussion section we examine the relative importance of past sales or past sales prices as compared to the three signals that we study on sales and average sales price respectively.

## 3.6 DISCUSSION AND CONCLUSIONS

### 3.6.1 Summary of contributions

The main aim of this paper is to study the effects of signals conveying quality information about producers' past performance in a market characterized by high uncertainty about the quality of the particular products on sale. We add to the marketing literature on quality signals by demonstrating the differential effects of four different kinds of signals on the sales behavior of our focal category of buyer: expert buyers. Our results show that past sales as well as reviews, awards and affiliations conveying information about producers' quality positively and significantly influence the number of sales and the sales price, but per kind of signal the level of credibility of the third party sources transmitting the signal moderates the strength of this effect. Additionally, we provide empirical evidence demonstrating the change in magnitude of the effect on sales when producers transition from having no signals in a given year to receiving one signal, and when they segue from no signal in a given year to two. In our analysis of past performance, we find serial correlation between past sales and current sales, indicating systematic patterns of performance persistence. We find that simply being reviewed, regardless of the level of credibility of the source transmitting the review, has a positive and significant effect on the quantity of sales to expert buyers compared to not receiving a review at all. Source credibility (of the third party source transmitting the review) does have a significant and positive effect on average sales price, which increases as the level of source credibility increases. With awards we see a steep increase in the number of sales, when in a given year a producer receives an award compared to not receiving an award; this pattern continues when receiving two awards but is only significant at high credibility levels. Awards influence sales price too; namely, there is an increase in the price paid for a product when a producer receives an award, compared to not receiving an award. But this is only significant at low source credibility levels, while receiving two awards positively and significantly affects sales price but only at higher credibility levels. Gallery affiliations also have a significant and positive effect on the number of sales and sales price. The increase in going from no affiliation to one affiliation or to two affiliations, as the level of source credibility increases, is monotonic. In a general sense, these results about signals and the credibility levels of the sources conveying these signals suggest the degree to which self-reinforcing processes govern competitive dynamics in markets characterized by high uncertainty about producer quality. This is even more the case when we notice the strength of the effect of past sales, which describes in a most direct manner the self-reinforcing effect of past performance.

The primary market for contemporary visual art is a suitable setting to test our hypotheses, precisely because it is so clearly characterized by imperfect and incomplete information about artwork quality (Becker, 1982; Caves, 2000). Within this empirical domain, we focus on customers who are clearly expert buyers, namely the curators of corporate art collections, and on producers who are alumni from an elite and highly selective fine arts program (RABK). This group of visual artists can be considered, at least initially, i.e., at the start of the program, to be a homogenous cohort because at selection they usually share the following comparable characteristics: similar previous art training, age, art practice experience, and technical art

making abilities. For this reason, we explicitly control for unobserved heterogeneity and omitted variable bias. Our specific hypotheses – about the effects of source credibility, numbers of signals, the interaction between source credibility and numbers, and past sales as signals – were all confirmed. The differences in the effect sizes of the different types of signals serve to better understand the weight of particular signals of quality in this particular market. Overall, the analysis shows the strength of the effect of signals and of past performance in markets with informational deficiencies, and transmits a sense of the extent to which self-reinforcing processes can govern competitive dynamics (Merton, 1968; Azoulay et al., 2013).

As noted before, the expert buyers we study are all members of the VBCN (the Netherlands Association of Corporate Art Collections) who frequently interact with each other. The high levels of connectivity between these corporate art collectors can be understood in terms of its usefulness in helping to reduce uncertainty about quality and decrease search costs associated with pre-purchase decision-making. Because these expert buyers are able to observe each other's actions directly and communicate regularly, the degree of observational learning is high, and this can lead to optimal purchase decisions (Bikhchandani, Hirshleifer and Welch, 1992). As new information about signals and past sales accumulates, these expert buyers may converge on buying the same producers' products, which may have the additional benefit of helping to increase both individual and collective payoffs by increasing the popularity of select producers.

Earlier studies on small world networks have shown that small groups of individuals disproportionately influence network dynamics because of access they have to new information, which they spread within the network (Milgram, 1967). For example in academia, Newman (2004) and Goyal et al. (2006) studied co-authorship across various academic disciplines, and found that a few, but very influential individuals spread new information to the network, keeping the small world structure strong. These individuals move between clusters of members in a network, increasing the connectivity between individuals in different clusters. However, too much connectivity has been shown to have a curvilinear effect on performance because with high levels of connectivity no new information enters the network, not even via highly influential members. When this happens individuals in the network may start behaving similarly (Uzzi and Spiro, 2005), and possibly start exhibiting herd behavior because of the lack of new information entering the network (Bikhchandani, Hirshleifer and Welch, 1992).

Again, in most of the previous studies the buyers were uninformed, rather than expert buyers, who are the focal category in this study. In fact, it is reasonable to expect that expert buyers would be less susceptible to herd behavior. However, this study strongly suggests that the choices of expert buyers can also be determined to a large extent by high levels of connectivity in a small world network that leads to paying attention to explicit evaluations of others and observed sales to peers, instead of making autonomous and well-advised decisions based on their professional knowledge. This counterintuitive conclusion is consistent with the results of an earlier study (Situmeang, Leenders & Wijnberg, 2014) that cast doubts on the independence of experts' decisions by showing how expert reviewers of sequels of computer games tend to follow the consumer reviewer of past editions of the same game, instead of the other way around.

### 3.6.2 Managerial relevance

In general, our findings are relevant for both producers and buyers active in markets with high uncertainty about quality and where information provided by signals about past performance drive dynamic economic processes. For instance, nascent ventures, high tech firms and professional services are examples of producers and/or products surrounded by high levels of uncertainty about quality. Our findings provide fine-grained specifications about the effects of different kinds of signals, transmitted by third party sources with different levels of source credibility, on sales. We also provide insights on how signals and past sales can increase performance differentials between competitors. From a marketing perspective, the empirical evidence provided by this study about signal effectiveness, may have two general implications for producers.

First, producers could start by making a strategic decision to invest part of their marketing budget to elicit select signals to gain competitive success. Because signals may provide producers with a reputational advantage, and this advantage may trigger preferential treatment from buyers and other decision-makers (Waguespack, and Salomon, 2015), it seems highly relevant for producers, and especially those active in markets with extreme informational gaps about product quality, to actively pursue becoming the recipients of signals transmitted by third party sources, even if it means investing money. Furthermore, signals, and especially early signals received by new competitors, may grant producers access to opportunities and/or material resources not available to other competitors. This is important because even seemingly minor or inconsequential initial advantages may lead to future systematic patterns of persistent performance if the opportunities afforded lead to superior performance (Merton, 1968; Azoulay et al., 2013; Sorenson and Waguespack, 2006). On the other hand, our results suggest that highly credible sources transmitting signals have a significantly greater impact than low credibility sources. So marketers must take care and ensure that the signals do not seem to be self-serving and of having little real value in terms of their likely credibility.

Second, producers such as nascent entrepreneurs, high tech firms and service professionals, could lower introductory prices to attract early adopters so that other buyers will imitate their purchase behavior. This strategy could be useful in generating past sales as a signal of quality. Especially in markets with hard to observe quality, and where buyers may use the same kinds of products yet are unable to differentiate between the quality of competing alternatives, early adopters may help to increase the popularity of a product. The social influence exerted by early adopters, may affect the preferences of those who observe their purchase decisions. Such social influence, starting at the individual level, may grow to influence collective level purchase decisions and significantly affect performance differential between competitors. In such settings, early adopters may also be a source of signals, particularly in terms of providing (online) reviews of products. Thus, both the direct effect of adoption and the indirect effect of signals need to be considered. As early adopters may at times provide negative reviews, innovators should be cautious and ensure that their products are of high standard before attempting to induce early adoption.

### 3.6.3 Limitations and future research

When considering the results of this study, there are some limitations to bear in mind, which also point to further research opportunities. In this paper, we focus on one type of product (i.e., contemporary visual art) from one type of producer (i.e., alumni from a highly prestigious art program), and we study the purchase behavior of one type of buyer: expert buyers (i.e., corporate art collectors in The Netherlands) who are largely active in one market segment (i.e., the primary art market). Although this empirical setting is extremely useful in analyzing the effects of different kinds of signals originating from different kinds of third party sources with different levels of source credibility, and studying the differential effects these signals have on producers' sales to expert buyers, follow-up studies could examine other empirical domains and focus on qualitative dimensions of signals, other qualitative dimensions of sources transmitting signals besides credibility, and characteristics of competitive processes in markets with high uncertainty about producer and/or product quality. We now discuss each of these possible extensions.

First, in markets with incomplete or imperfect information about producer quality, different kinds of signals may also have different qualitative dimensions. Valence, i.e., positive or negative tenor of the information conveyed by the signal, is an example of such a qualitative attribute. As mentioned earlier, the valence of the focal signals in our study is positive, but that is specific to our empirical context. Expanding our research, it could be useful to focus on other settings in which there are many different kinds of signals from different kinds of sources, and where the information conveyed by signals has different valence. Earlier studies have analyzed valence in the context of movie reviews (e.g., Basuroy, Chatterjee and Ravid, 2003; Chen, Liu, and Zhang, 2012) and books (e.g., Berger, Sorensen, and Rasmussen, 2010). These studies, however, focused on one kind of signal transmitted by one kind of third party source to uninformed buyers, and analyzed the effects on producers' sales performance immediately after the signal had been transmitted. We suggest focusing on settings with signals from both first and third party sources, and study interaction effects between different kinds of signals and the positive or negative tenor of the message they are conveying. Of course first party signals will have positive valence but other signals from third party sources can range from being highly positive to highly negative. Gaining a better understating of how qualitative dimensions of signals affect signals' persuasive power on expert buyers and uninformed buyers could provide novel insights into how signals help producers gain advantages that may lead to superior performance persistence.

Second, we focus on credibility as a characteristic of third party sources; we determine credibility of each source in our dataset based on validated scales measuring sources' expertise and trustworthiness (Ohanian, 1990) as perceived by our focal buyers. However, it is possible that there are other qualitative dimensions of sources that may also provide useful explanations to understanding differential effects of signals on buyer behavior. For instance, earlier studies have shown that the level of status, i.e., high or low, of individuals or organizations is positively correlated to their performance outcomes (e.g., Washington and Zajac, 2005; Podolny, 1993). It is reasonable to expect high status third parties to transmit signals that are more persuasive, having greater positive effects on buyer behavior, compared to sources of lower status.

Exploring source characteristics, such as status, of first and third parties transmitting signals and focusing on the differential effects these signals have on uninformed and expert buyers could potentially be another useful extension to our study, especially since status itself is a signal of quality (Podolny, 1993).

Third, another interesting avenue of research would be to explore the characteristics of competitive processes in markets, specifically those with incomplete and imperfect information about quality. One way to do this is to differentiate between different types of “selectors” that convey signals. Selection system theory (Wijnberg and Gemser, 2000; Wijnberg, 2004) describes three ideal types of selectors: market, expert and peer. With selection system theory competitive processes can be viewed in terms of the relative importance of different types of selectors that buyers rely on when making pre-purchase decisions among competing alternatives (Gemser, Leenders and Wijnberg, 2008). For instance, in a study focusing on how awards affect sales performance of mainstream films and art-house movies, Gemser, Leenders and Wijnberg (2008) argued that if the preference of the selectors conveying the signal is the same as the buyers making the purchase decisions than signals’ effectiveness is high, compared to selection preferences between selectors and buyers that are different. In our study, we focused on the extent to which signals conveyed by third party sources affect expert buyers; using selection system theory typology, the signals in our study are predominately conveyed by expert selectors. A useful extension to our study could be to examine the effects of signals conveyed by peer selectors. Comparing the effects of signals originating from peer selectors to those originating from expert selectors or even market selectors<sup>37</sup> could provide a finer-grained understanding of competitive dynamics in markets with high uncertainty about producer quality.

### 3. 7 APPENDIX

#### APPENDIX A: Correlation matrix

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1) LAGGED REVIEW COUNT	1.0000							
(2) LAGGED AWARDS COUNT	0.1691	1.0000						
(3) LAGGED AFF COUNT	0.0842	0.0332	1.0000					
(4) LAGGED REVIEW CRED	0.9803	0.1635	0.0902	1.0000				
(5) LAGGED AWARDS CRED	0.2174	0.8990	0.0366	0.2157	1.0000			
(6) LAGGED AFF CRED	0.0963	0.0303	0.9647	0.1051	0.0357	1.0000		
(7) LAGGED SALES COUNT	0.1693	0.0410	0.1203	0.1829	0.0705	0.1353	1.0000	
(8) LAGGED SALES PRICE	0.11800	0.0097	0.0428	0.1240	0.0204	0.0472	0.3418	1.0000

Legend: r values are significant at p<.01

Observations: N = 12717

Artists: N = 471

<sup>37</sup> Examples of signals based on market selection are the MTV Award and People’s Choice Award, where primarily end users choose the recipients of the signals.

## CHAPTER 4

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### **CROSSING THE THRESHOLD AND EXISTING NASCENCY:**

Antecedents to gaining full-fledged legitimacy

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## ABSTRACT

New entrepreneurs experience the liability of newness in the nascent stage of their competitive activity. In many industries, the exit from this stage takes place through an explicit decision of a core mediator that allows the new entrepreneur to enter the market as a fully legitimate competitor. The construction of full legitimacy denoted by the decision of the core mediator, can itself be affected by signals about the entrepreneur while still in the nascent stage. In the setting of the contemporary visual arts, we use a unique longitudinal data set to analyze third party signals as predictors of the first affiliation with an art gallery, who in this empirical context is the core mediator. We find that the credibility and the diversity of the sources signaling about the focal competitor are strong determinants of the core mediator's decision to allow the new competitor to cross the legitimacy threshold and exit the nascent stage.

### Keywords

*Nascent stage, signals, source credibility, source diversity, liability of newness, legitimacy threshold*

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## 4.1 INTRODUCTION

Nascent entrepreneurs strive to exit the stage of nascency and become fully-fledged competitors. A successful entrepreneur is one who is at the very least not a nascent entrepreneur anymore. Although there is a broad stream of studies about the determinants of entrepreneurial success, from individual characteristics, including human and social capital of entrepreneurs and organizational founders (Davidsson and Honig, 2003) or the composition of a start-up team (Franke, Gruber, Harhoff and Henkel, 2006; 2008) to the stories entrepreneurs can tell about themselves (Lounsbury & Glynn, 2001). Most of these studies focus on determinants that will increase chances that nascent entrepreneurs find resources (Newbert and Tornikoski, 2013), especially funding, that is essential to their survival. This implies that these determinants must be observable by the resource providers, i.e., there must be signals conveying quality characteristics of the entrepreneurs or entrepreneurial teams or the venture itself. The signals in such studies are almost all first party signals; in other words, they originate from the entrepreneurs themselves. Signals originating from third party sources are of course rare in the very early stages of an entrepreneur's competitive activity. Yet, precisely because they are rare, they can have a strong effect on the decision-making processes of stakeholders and help new entrepreneurs overcome competitive disadvantages associated with the liability of newness (Stinchcombe, 1965), effectively exiting nascency.

In studies of early stage ventures, the explicit focus sometimes is on one actor who plays a crucial role in this process, such as an angel investor or venture capitalist (Franke, Gruber, Harhoff and Henkel, 2006; 2008). If such a core actor offers support to the nascent venture this usually means that the venture exits the stage of nascency. Most often this core actor is a provider of essential financial resources or know-how or access to networks. Less attention has been paid to another type of actor who can play a crucial role in allowing a nascent entrepreneur to compete like the other incumbents: the actor through whose mediation the nascent entrepreneur gains access to potential customers on the same footing as incumbent competitors.

The concept of legitimacy, defined as an actor's conformity to accepted behaviors and norms as well as adherence to audiences' shared beliefs (Suchman, 1995) occupies an important role in our argument. Scholars have argued that reaching a so-called 'legitimacy threshold' is a pivotal event because an actor is no longer subject to the liability of newness and previously unattainable resources, e.g. capital, networks, and an existing customer base, are now within reach (Stinchcombe, 1965; Zimmerman and Zeitz, 2002; Rutherford and Buller, 2007; Rutherford, Buller and Stebbins, 2009). First, as we will argue in this paper, the end of the nascent stage is when full-fledged legitimacy is achieved; second, the core mediator needs to be fully legitimate; and third, we consider the construction of legitimacy for the nascent entrepreneur to be a multistage process. Expanding upon this last point, the core mediator's decision will complete the achievement of full legitimacy, but this decision does not happen in a vacuum. Rather, it happens in conjunction with the core mediator's private knowledge about the new entrepreneur. The core mediator will likely engage actively in search efforts, social interactions and cognitive processing of information to gain this knowledge (Bitektine, 2011;

Tost 2011). The resulting decision will at the very least be co-determined by signals transmitted by third party sources about the new competitor that reach the core mediator. The level of credibility of these sources will contribute to the growth of the legitimacy of the new competitor until the final decision of the core mediator is made, granting the entrepreneur full-fledged legitimacy and full entry into the relevant market.

Thus, the main contribution of this study is to analyze the effect of third party signals about competitors in the nascent stage on such core mediators whose main role vis-à-vis the nascent entrepreneur is to offer full access to the relevant market. Although previous research has acknowledged that crossing the legitimacy threshold is important to an actor's future performance, there have been no quantitative studies focusing on the determinants of this event itself. In this paper we analyze these antecedents empirically. In particular, we focus on the diversity of third party sources transmitting signals about a particular nascent entrepreneur and the credibility level of the sources expressing them. We propose that a greater diversity of sources endorsing a new entrepreneur helps them cross the legitimacy threshold after entering the market, because third party sources transmitting signals that are more diverse create greater audience awareness and help shape a consensus opinion that unambiguously communicates the new competitor's adherence to shared values and norms. Moreover, we argue that the credibility of the evaluators emitting the signals has a positive effect, as highly credible sources are comparatively more influential than others (Sternhal, Dholakia and Leavitt, 1978; Pornpitakpan, 2004).

The empirical setting of our study is the contemporary visual arts. Specifically, we focus on the primary art market, where artworks are sold for the first time (Singer and Lynch, 1994). In this context, there are many mediators, but the core mediator offering access to the market is the first art gallery the artist affiliates with (Janssen and Verboord, 2015). By representing artists at art fairs, exhibiting artworks, opening up their network of collectors, curators and critics, and stimulating loans or purchases to museums, private and corporate collectors, art galleries commit both tangible and intangible resources to affiliated artists (Ertug, Yogev, Lee and Hedstrom, 2015; Velthuis, 2003; Caves, 2003; Prinz, Piening and Ehrmann, 2015). We analyze the effects of different types of third party signals: reviews, awards, merit based subsidies, and the artist's past sales. We specifically focus on the effects of the diversity of the sources transmitting these signals and the variance of source credibility as predictors of an affiliation with a first art gallery. Diversity of sources can be interpreted as an aggregate indicator of quality, conveying an opinion about an artist's legitimacy (Bitektine and Haack, 2015), while the persuasive qualities of those signals are determined by the credibility i.e. expertise and trustworthiness, level of the sources conveying them (Sternhal, Dholakia and Leavitt, 1978; Pornpitakpan, 2004; Ohanian, 1990; Hovland, Janis, and Kelley, 1953; Meyer, 1988; Newell and Goldsmith 2001).

Our study is structured as follows. We begin with a literature review on the nascent stage in relation to legitimacy, as well as on third party signaling. We then present our hypotheses about the source credibility and source diversity. After describing our setting, data, and methods, we present and discuss our results.

## 4.2 THEORETICAL FRAMEWORK AND HYPOTHESES

### 4.2.1 The end of nascency and the role of the core mediator

Most nascent actors suffering from the liability of newness experience hardships caused by internal factors, such as inexperience, uncertainty about future resources and underdeveloped professional networks (Stinchcombe, 1965; Carroll and Delacroix, 1982; Carroll, 1983; Freeman, Carroll and Hannan, 1983; Singh, Tucker and House, 1986), and external factors, such as being in competition with actors who are no longer exposed to these hardships.

There is an ongoing debate about the usefulness of distinguishing between specific stages in the lifecycle of entrepreneurial ventures firms (for review see Levi & Liechtenstein, 2010). However, there is general consensus about distinguishing between a nascent stage and the rest of the life of the venture. If the liability of newness is a real phenomenon, it is precisely the nascent stage in which it has its effects. The hardships that are caused by the liability of newness both contribute to and are aggravated by lacking or incomplete legitimacy, making it difficult for that actor to compete against other legitimate competitors in a relevant market.

Legitimacy is "a generalized perception or assumption that the actions of an actor are desirable, proper or appropriate within a socially constructed system of norms, values, beliefs and definitions" (Suchman, 1995; p. 574). It reflects congruence between the expectations of an audience and the behavior of the actor (Deephouse and Carter, 2005; DiMaggio and Powell, 1983; Suchman, 1995). As such, legitimacy helps audience members overcome doubts they may have about whether an actor without a proven track record should be considered a full fledged competitor or not. In other words, legitimacy provides a basis for audience members to make decisions about an actor considering that actor's qualities compared to other competitors in the market (Zimmerman and Zeitz, 2002; Bitektine, 2011; Tost, 2011). This is important because being perceived as being fully legitimate by a focal audience could have far reaching effects on actors' performance outcomes, which in turn may affect their reputation and/or their position in a status hierarchy (Gould, 2002; Jensen and Roy, 2008; Washington and Zajac, 2005).

Institutional theorists have suggested that a point exists "below which nascent actors struggle for existence and probably will perish, and above which they can achieve further gains in legitimacy and resources" (Zimmerman and Zeitz, 2002, p. 414). This point, referred to as the legitimacy threshold (Zimmerman and Zeitz, 2002; Rutherford and Buller, 2007; Rutherford, Buller, and Stebbens, 2009) is crossed when "an actor moves from an untenable collection of resources to a potentially sustainable enterprise" (Rutherford and Buller, 2007; p. 78). Entrepreneurs described crossing the threshold as an event after which they had "a feeling of relative permanence as opposed to a general feeling of impending failure" (Rutherford, Buller, and Stebbens, 2009 p. 78). Crossing the threshold is a crucial event because it unambiguously conveys that an actor is a fully legitimate competitor to members of the audience (Zimmerman and Zeitz, 2002; Rutherford, Buller, and Stebbens, 2009; Rutherford and Buller, 2007), effectively helping to reduce competitive disadvantages producers are exposed to in nascency (Stinchcombe, 1965).

There are more implicit and more explicit ways of crossing this threshold, but in many industries a specific signal by a specific type of intermediary or gatekeeper can denote this

crossing, to the entrepreneur and to the market audience. In their study on legitimacy acquisition, Rutherford and Buller (2007) found that eight out of 11 nascent entrepreneurs they interviewed referred to a feeling of 'making it' after receiving a positive signal originating from a core evaluator. A straightforward form of such a core mediator would be a certifying board that legally allows someone to practice a particular profession independently. Other well-studied examples are highly reputable venture capitalist whose participation will denote to potential customers that the new venture is to be taken seriously (Pollock, Chen, Jackson and Hambrick, 2010.) Other examples, similar to the empirical setting of this study, are furnished by industries in which major retailers control access to final customers, and the survival of new products from nascent entrepreneurs depends entirely upon retailers' selection and acceptance of those products into their retail mix (Kaufman, Jayachandran and Rose (2006).

When new competitors need to find support of or affiliation with such core mediators they should seem legitimate enough to make the core mediator decide to help them to complete their legitimacy to the market. The nascent entrepreneurs credentials and behavior can play a major role to achieve legitimacy in the eyes of major external stakeholders (Nagy, Pollack, Rutherford & Lohrke, 2010). However, the nascent competitor is in a double bind, because precisely as long as a new competitor lacks legitimacy, the signals it emits about itself will be considered less credible. Therefore, signals emitted by independent third parties will be of the highest significance in the nascent stage as means to exit that stage.

#### 4.2.2 Third party signals

Signals convey publically observable information about an actor's unobservable or latent quality (Spence, 1973, Bergh, Connelly, Ketchen and Shannon, 2014; Connelly, Certo, Ireland and Reutzel, 2011). In markets with imperfect information about quality, signals act as proxies helping to reduce stakeholders' uncertainty associated with decision-making among competing alternatives (Spence, 1973). High-risk financial assets, high-tech products and artworks sold on the primary market for contemporary visual art are examples of products where underlying quality is largely unknown to all parties involved in the transaction. Signaling theory (Spence, 1973) describes how signals, e.g., reviews, awards, affiliations and past sales, help create a separating equilibrium making it possible for stakeholders to distinguish between the relative quality among competing actors. The core idea being: it is less costly, or less difficult, for high quality actors to receive signals compared to those of lower quality (Spence, 1973; Bergh et al., 2014; Connelly et al., 2011). In addition to acting as proxies of quality, signals help simplify decision-making by transforming indiscernible quality into a common metric (Espeland and Steven, 1998), and enabling relative comparison among competitors (Bergh, Connelly, Ketchen and Shannon, 2014).

An important distinction can be made between signals originating directly from the focal actor, who is also the subject of the signal, and from third party sources, who evaluate the focal actor's quality and disseminate that information to a broader public (Sauder, 2006). Many studies in management science and entrepreneurship focus on the influence of individual signals transmitted directly by the focal actor, e.g., board member characteristics (Certo, 2003), CEO background (Zhang and Wiersema, 2009), top management team characteristics

(Lester, Certo, Dalton, Dalton and Cannella, 2006), and founder involvement (Busenitz, Fiet and Moesel, 2005; Ahlers, Cumming and Günther and Schweizer, 2015). However, research shows that signals transmitted by third party sources are more likely to be perceived as being fair and accurate (Lampel and Shamsie, 2000; Pollock and Rindova, 2003) compared to actors transmitting signals about themselves. Signals from third party sources help shape reputations about the actor who is the recipient of the signal (Higgins and Gulati, 2003) and help define status hierarchies (Scott, 1994; 1995). Examples of signals from third party sources are: reviews (Eliashberg and Shugan, 1997; Basuroy, Chatterjee and Ravid, 2003), awards (Anand and Watson, 2004; Gemser, Leenders and Wijnberg, 2008), prestigious affiliations (Pollock, Chen, Jackson and Hambrick, 2010; Pollock, Porac, and Wade, 2004) venture capitalist backing (Gulati and Higgins, 2003), credentialing devices such as certifications (Rao, 1994; Rindova, Williamson, Petkova, and Sever, 2005).

Third party sources transmitting quality information about actors also function as mediators between producers and a focal audience. As mediators they can take on the role of being selectors (Gould and Fernandez, 1989; Foster, Borgatti and Jones, 2011; Gemser, Leenders and Wijnberg, 2008; Ebbers and Wijnberg, 2012) and/or evaluators and promoters (Hirsch, 1972; Hsu, 2006). They may even be in the position selectively grant "outsiders access to members of his or her own group" (Gould and Fernandez, 1989:92). In other words, the decisions third party sources make about actors can directly impact those actors' access to and success in a market (Hirsch, 1972; Peterson, 1997; Glynn and Lounsbury, 2005; Foster et al., 2011). As argued, there can be a core mediator that bestows an actor full-fledged access to a market by pure virtue of the signal that core mediator transmits about that actor. However, such a core mediator's decision to endorse an actor does not occur in a vacuum, other signals about that competitor can substantially influence the core mediator's decision. These signals can come from different kinds of third party sources and as we will argue immediately below, both the credibility of third party sources and the diversity in kinds of sources transmitting signals about a focal actor can play a role in determining how strong the signals will affect the core mediator's decision.

#### 4.2.3 Source credibility of third party sources

Not all third party sources transmitting signals about actors are equally effective in communicating the actor's appropriateness and desirability, as some have a disproportionately larger influence on audience members than others (Suchman, 1995; Bitektine, 2011; Tost, 2011; Zuckerman, 1999). Signals are not simply accepted at face value, but rather the audience first judges the willingness of the source to communicate unbiased and accurate information (Kelley, 1967; Eagly and Chaiken, 1975; Mizerski, Golden and Kernan, 1979). Earlier studies have shown that the credibility of the source conveying a signal is a determinant of the strength and impact of that signal (Sternhal, Dholakia and Leavitt, 1978; Pornpitakpan, 2004). Source credibility can be defined in terms of audience perceptions about third parties' expertise and trustworthiness. Expertise refers to the extent to which a third party source is recognized as having knowledge and experience (Hovland, Janis, and Kelley, 1953; Ohanian, 1990), while trustworthiness refers to the extent to which the third party source is thought to be honest and dependable (Hovland et al., 1953; Meyer, 1988; Newell and Goldsmith 2001).



In other words, if a third parties' credibility is high, an audience is more willing to accept the signal transmitted by that source.

These same highly credible third parties will also be highly selective in choosing about whom they signal, which is in part due to reputational and/or financial costs they may incur if the signal turns out to be incorrect. Transmitting false or inaccurate signals may have far-reaching negative effects on their reputation (Bergh et al., 2014) and/or negatively impact their economic benefits (Ippolito, 1990). Hence, highly credible third party sources are likely to exercise even more caution when their signaling concerns nascent entrepreneurs, precisely because of the uncertainty surrounding their underlying quality. Moreover, the fact that these nascent entrepreneurs have high failure rate further depresses the likelihood that third parties will pay attention to them. If the entrepreneurs have failed and disappeared, having evaluated them positively could reduce stakeholders' confidence in the third party sources' expertise and trustworthiness. In this sense, the fact that highly credible third parties take a nascent entrepreneur seriously enough into account to transmit signals about her/him could be interpreted that the focal entrepreneur is to be taken seriously by other market actors, such as the core mediators.

Thus, precisely because of these defensive mechanisms, if a highly credible third party does signal about a nascent entrepreneur, a strong effect can be expected on the entrepreneur's likelihood of crossing the legitimacy threshold. Thus, we hypothesize:

*Hypothesis 1: The greater the source credibility of third parties conveying signals about a competitor in the nascent stage, the greater the likelihood that the core mediator will allow this competitor to cross the legitimacy threshold and exit nascency.*

#### 4.2.4 Diversity of Sources

Bitektine and Haack (2015) proposed that signals, particularly the quantity of signals, convey an actor's "share of voice", which over time coalesces into a majority opinion about that actor's legitimacy. Other studies have empirically demonstrated a positive relationship between the number of signals of the same kind conveyed about an actor and that actor's performance outcome (Pollock and Rindova, 2003; Stuart et al., 1999; Certo, 2003; Higgins and Gulati, 2003, 2006), attributing this relationship partially to a "buzz" created about the focal actor (Dye, 2000). However, other studies have found a less straightforwardly positive relationship between the quantity of signals and their aggregate effect. For instance, Pollock, Chen, Jackson, and Hambrick (2010) studied inter-organizational affiliations as signals and found that the value of additional signals of the same kind transmitted by third parties, i.e., venture capitalists, and to some extent underwriters, weakened over time. The explanation they suggest is that there is a diminishing value to the addition of another signal transmitted by third party sources, because these signals function mainly as certifications.

In general, the study above suggest that more signals of the same kind may have decreasing additional value, which, inversely, suggests that when one controls for the number of signals, the extent to which the sources transmitting signals are diverse increases the cumulative strength of these signals. Signals of different kinds are more salient, and therefore even more likely to

be noticed by audience members than signals of the same kind. Moreover, they originate from different third party sources, and hence, are visible in different outlets. A core mediator can feel more confidence in the aggregate of the evaluations by third parties, precisely because they come from sources with very different characteristics. If only third party sources of a particular kind would have a particular judgment about a focal actor this could have to do with the particular perspective or bias of that particular kind of source. Having information from very diverse sources facilitates discounting for these specific biases. Additionally, the core mediator observing these signals is less likely to discount diverse sources based on the suspicion that third parties of the same kind are copying one another (DiMaggio and Powell, 1983). Indeed, although third parties may engage in isomorphic behavior in emitting signals about a particular competitor, we argue that the core mediator will interpret the diversity of sources transmitting signals about the focal actor as a cue of acceptance by diverse sources. This, in turn, will help convince the core mediator to allow the competitor to cross the legitimacy threshold. Thus, we hypothesize:

*Hypothesis 2: The greater the diversity of the sources transmitting the signals about a competitor in the nascent stage, the greater the likelihood that the core mediator will allow this competitor to cross the legitimacy threshold and exit nascency.*

### 4.3 EMPIRICAL SETTING

#### 4.3.1 Art galleries and the primary art market

In the empirical setting of the primary market for contemporary art, the art gallery is the core mediator, as it fulfills a crucial role in reducing uncertainty by rendering judgments about an artist's desirability and appropriateness (Velthuis, 2003; Janssen and Verboord, 2015; Prinz et al., 2015). Gallery owners are not simply salesmen selling artworks; they also select, interpret, and help generate awareness about artists (Velthuis, 2003). An important role of a gallery is to help articulate an artist's intent to the public by providing context for the artwork within their gallery. To do this, galleries employ many techniques to increase an artist's visibility, such as attending art fairs, encouraging purchases or loans to museums, private collectors and corporate collectors, and temporarily exchange artworks with galleries in other cities (Caves 2000; Velthuis, 2003). They also aid audiences in better understanding the quality of the artworks. Because of these reasons, having an affiliation with an art gallery is essential for new artists to compete in the primary art market (Prinz et al., 2015; Ertug et al., 2015; Velthuis, 2003). However, galleries' choice to affiliate can entail a considerable amount of risk. By entering into an affiliation with an artist, galleries commit financial and reputational resources by supporting the artist and granting them access to a network of collectors. The galleries can observe a range of signals about new artists and, as previous studies concerning this industry show, the most important of these are reviews, awards, merit based subsidies, and past sales (Caves, 2000; Prinz et al., 2015; Ertug et al., 2015; Velthuis, 2003; Yogev, 2010; Jyrämä, 2002).

### 4.3.2 Renowned art academy

Our data originates from the Gerrit Rietveld Academie, an internationally renowned art school located in Amsterdam, the Netherlands, which offers a four-year undergraduate program where students can earn a Bachelor of Fine Arts degree or a Bachelor of Design degree. Annually, the total student body across both majors is 850 students. Roughly 50 % are fine arts majors and the other 50% are design majors. Close to 70% are international students and the average age of a freshman is 21. Roughly 1000 applicants apply every year and around 250 are accepted. ([www.gerritrietveldacademie.nl](http://www.gerritrietveldacademie.nl)).

In this paper, we focus on alumni from the fine arts program, who work in the following art disciplines: painting, sculpture, photography, drawing, installations, and art videos. The alumni of the Rietveld Academie are predominately active on the primary market, where artworks are sold for the first time either directly by the artist or through intermediaries such as an art gallery (Singer and Lynch, 1994).

### 4.3.3 Data collection and sample

We conducted a survey among alumni of the Rietveld Academie who graduated between 1990 and 2010; we sent an online questionnaire with two follow-up e-mail requests every two weeks after the first invitation. This resulted in a 35 percent response rate, amounting to 640 responses. Additionally, desk research was conducted to verify the self-reported information and to collect supplementary data about artists' careers. This included gathering information from artists' websites, galleries' websites, and ArtFacts.com, an art market website. Artfacts.net collects detailed information about more than 100,000 visual artists' annual exhibitions at more than 600,000 art galleries, museums and other international venues ([www.artfact.net](http://www.artfact.net)).

We excluded alumni who indicated to be applied artists, e.g. designers, because they have considerably different career trajectories than visual artists. Furthermore, we excluded alumni who indicated they were never actively pursued an artistic career after graduation (n=91), as well as those whose responses were incomplete, resulting in a final dataset consisting of 422 artists.

We were aware of possible non-response bias in our survey. Following Reid (1942) and Armstrong and Overtom (1997), we took a random sample of 10% (n=118) of the non-respondents who graduated from the fine arts program and checked their Internet history. We found that 91% were not active artists; and of the ten individuals whose Internet history indicated they were, one had a gallery affiliation; we included these ten artists into our data. By checking the Internet history of the sub-sample of the non-respondents, and based upon Reid (1942) and Armstrong and Overtom (1997), we infer that this group is representative sample of non-respondents, and that non-response bias is not an extreme flaw in of our survey.

## 4.4 EMPIRICAL STRATEGY

### 4.4.1 Model

The likelihood to experience a focal event, such as a first affiliation with an art gallery, is time-to-event data for cross-section analysis. Because of right-censored observations and time-varying covariates, we analyze these data using event-history methods. In such models,

the dependent variable takes the form of a hazard rate, representing the likelihood of individual artists to enter a first affiliation. The effect of independent variables on the hazard rate is estimated via semi-parametric Cox models. We opt for these models because they exempt us from specifying an underlying probability density function for the baseline hazard, which is unknown. Estimates from these models are consistent as long as the proportional hazards assumption is met. We check this assumption through the Therneau-Grampsch test of non-zero slope and the analysis of Schoenfeld residuals. Furthermore, we introduce interactions between our independent variables and the logarithm of observation time in order to assess the risk of time dependence.

*The hazard rate is given by the following formula:*

$$h_i(t) = h_0(t) \exp(\beta * z) \quad (1)$$

where  $h_i(t)$  is the hazard of not having an affiliations,  $h_0(t)$  is the unspecified baseline hazard function,  $t$  is the time to affiliation,  $\beta$  is the vector of parameters associated with our predictor variables, and  $z$  is the vector of the predictor variables.

### 4.4.2 Variables

#### 4.4.2.1 Affiliation with art gallery

Our dependent variable is dichotomous and measures whether an artist had an affiliation with an art gallery after graduation. It is coded one for those who had an affiliation and zero for those who did not. Out of 422 artists in our sample, 119 enter an affiliation with an art gallery. Slightly more than 25 percent of all artists have their first affiliation within five years after graduating, and nearly 42 percent have it within 10 years.

#### 4.4.2.2 Source credibility and source diversity

Our main explanatory variables focus on credibility levels of third party sources transmitting signals about focal producers and the effects of source diversity on producers' performance outcomes. Source diversity measures the heterogeneity of different kinds of third party sources transmitting different kinds of signals, and the different levels of source credibility. Particular emphasis is placed on quantitative characteristics and qualitative attributes of source diversity in a given time period. This is important because the level of source diversity and the level of source credibility may function as an aggregate indicator of quality, and help transform heterogeneous quality information it into a common metric (Espeland and Steven, 1998), which enables relative comparison among competing producers without additional information costs (Spence, 1973, 1974; 2002; Bergh et al., 2014).

First, we determine the source credibility of third party sources transmitting different kinds of signals: reviews, awards, and merit based subsidies. The distribution of each kind of signal across all artists before an affiliation or the end of our observation period is: 626 reviews, 271 awards, and 253 subsidies. Each third party source transmitting a signal of a particular kind is scored on a scale from one (low) to five (high) based on our source credibility rankings (discussed

in the next section). Then the average score is taken as our measure of source credibility per signal kind and per artist. A variable for past sales, as a signal of quality, is included. This variable takes the value of four if an artist sold an artwork to a museum, corporate collections or well-known private art collectors; otherwise past sales receive a value of two. The distribution of sales across all artists before an affiliation or the end of our observation period is 44 sales.

Second, we distinguish between source diversity by focusing on quantitative characteristics and qualitative attributes of third party sources. In the first case, we focus on the quantitative characteristics by computing a Herfindahl-type diversity index based upon the total number of sources transmitting signals of each kind about a focal artist. The index equals the sum of the squares of the ratios of third party sources transmitting signals of each kind over the total number of signals transmitted by third party sources, so that higher values indicate a higher concentration of sources transmitting signals of the same kind, and lower values indicate a greater heterogeneity of third party sources transmitting different kinds of signals. We reverse-code this variable for ease of interpretation, so that an increase corresponds to higher diversity of sources. In the second case, we focus on the qualitative attributes of source diversity by measuring the variance of the credibility levels of third party sources transmitting signals per artist. We then calculate the average score per artist as our measure.

The focal third party sources transmitting signals are media outlets publishing reviews, organizations or institutions issuing awards, and publically funded institutions granting subsidies. Reviews are printed in either art or non-art journals<sup>38</sup> or international/national/regional<sup>39</sup> newspapers and are broadly interpreted as anything from a discourse about an artist's oeuvre to critiquing national and international exhibitions. Awards range from local art awards issued by art schools to national art awards such as the Prix de Rome to internationally recognized art awards such as the Turner Prize presented by Tate Britain.

The Prix de Rome was first introduced in the Netherlands by Napoleon in 1808 to stimulate fine arts. Over the centuries the aim of the award has not changed, although in addition to fine arts, stimulating creativity in architecture has been added. Various institutions in the Netherlands have organized the Prix de Rome, the oldest award for visual artists and architects under the age of 40; two editions of the award for fine arts and one edition for architecture are organized every four-year period ([www.prixderome.nl](http://www.prixderome.nl)). The Turner Prize is an annual award given to British artists and/or artists of other nationalities living and working primarily in Britain. It was founded in 1984 by the Patrons of New Art to help the Tate Gallery acquire new artworks. Initially, in addition to visual artists, the award was given to curators, critics or gallery directors for their contribution to art. This changed in 1988, and only visual artist could be nominated and win the award; in 1991, a maximum age limit of 50, was introduced ([www.tate.org.uk/whats-on/tate-britain/exhibition/turner-prize](http://www.tate.org.uk/whats-on/tate-britain/exhibition/turner-prize)). Additionally, we differentiate between merit-based subsidies granted by the Mondriaan Fund and the Amsterdam Fund for the Arts and need based subsidy from Wet Werk en Inkomen Kunstenaars (WWIK), which was discontinued in 2012.

The core aim of the Mondriaan Fund is to "promote the production and presentation of relevant Dutch visual art and heritage in the Netherlands and abroad, where a commercial market is (yet) undeveloped" ([www.mondriaanfonds.nl/en/about](http://www.mondriaanfonds.nl/en/about)). Their annual budget in 2016 is 26 million euro, and selection for talent development grants and other projects seeking financing is competitive and selection is based upon merit. Similarly, the Amsterdam Fund for the Arts supports artists and other cultural organizations, with the aim to enrich the experience of life in the city of Amsterdam ([www.Amsterdamsfondsvoordekunst.nl](http://www.Amsterdamsfondsvoordekunst.nl)). The annual budget in 2016 is 31.5 million euro, for both individual grants and subsidies for cultural organizations. As already mentioned, the WWIK a need based subsidy was discontinued in 2012, but during its existence it offered artists supplementary income for a maximum period of four years enabling them to continue their art practice, even if this was not generating income. Every ten years a new application could be submitted.

#### 4.4.2.3 Measuring credibility of third party sources

The credibility of the evaluators, namely: media outlets publishing reviews, institutional and private collectors, organizations issuing awards and subsidies, and art galleries was determined based on ratings by judges who were chosen from a random group of art experts. The panel of judges consisted of a visual artist, a curator, and one of the authors. Judge 1 is male, 60-years-old, and a full time visual artist, whose art career spans 35 years. He studied and worked with Sol LeWitt, an American artist who is linked to movements such as Conceptual art and Minimalism; additionally judge 1 has extensive international exhibition experience, and has sold many of his artworks to international private art collectors and museums. He is also the lead artist for Sol LeWitt wall drawings at European and Asian contemporary art museums. Judge 2 is female, 38-years-old, and a free-lance art curator, responsible for organizing international art exhibitions. She has an academic education, and has worked as a graphic designer and in an art gallery; additionally she is professionally active organizing art exhibitions in Europe for the last ten years. And as mentioned earlier, Judge 3 is one of the authors, who also studied visual art. These judges scored 200 out of the 967 third party sources using a five-point Likert scale to score a validated multi-item scale underlying the source credibility construct; the items in this scale are: trustworthiness, honesty, dependability, experience, expertise and knowledgeability (Ohanian, 1990). If the judge did not know the source and could not provide a rating based upon a quick Internet search, then 'do not know source' option could be checked.

Then, we calculated the internal validity of the scale items ( $\alpha = 0.98$ ) and estimated the inter-rater reliability between the judges using an intra-class correlation coefficient, specifically a two-way random effects model (Shrout and Fleiss, 1979). This resulted in  $ICC(2,3) = 0.744$ , significant at  $p < 0.001$ . This value suggests that each judge's rating is relatively consistent with the other judges (Bravo and Potvin, 1990). Given this reassuring internal validity score, one of the authors scored the remaining 800 evaluators.

#### 4.4.2.4 Control variables

We include the following control variables. First, we a variable that measures the sum of the count of the four kinds of signals after graduation; we include this variable because the

<sup>38</sup> Examples of art journals are: The Art Newspaper, Art Review, Art Monthly, Metropolis M, De Witte Raaf, and Kunstbeeld.

<sup>39</sup> Examples of international newspapers are: New York Times, The Guardian; national newspapers: NRC Handelsblad, de Volkskrant; regional newspapers: Noordhollands Dagblad.

number of signals may function as an aggregate indicator of quality (Spence, 1973; Bergh et al., 2014; Connelly et al., 2011; Espeland and Steven, 1998). We also control for age at graduation, and gender where male is coded as zero and female as one. Based on the fine arts degree artists obtained, we consider the three main art disciplines for autonomous fine arts, namely audiovisual art, photography and visual arts, which is a basket variable that includes painting, drawing, installation and sculpture. We use audiovisual as our base. The ratio of male to female is 0.371. The frequency distribution of art disciplines is: 133 for audiovisual art, 65 for photography, and 224 for visual arts. In addition, we control for the total number of signals received by artists prior to graduation. We also control for affiliation with an art gallery prior to graduation; if an artist had a pre-graduation affiliation a value of one was assigned, otherwise zero. We record a total of 144 pre-graduation signals, distributed among 76 artists, and 71 artists had pre-graduation affiliations. We include a control variable for the exogenous shock of the financial crisis in the art world post 2008. If an artist had an affiliation with an art gallery before 2008, a value of zero was assigned, otherwise one.

#### 4.5 RESULTS

The correlation matrix in Appendix A presents descriptive statistics and pairwise correlation matrix for our independent variables. Most correlations between our explanatory variables are below 0.50; however the correlations between some of our variables exceed this level, which may indicate multicollinearity between pairs (Hair, Black, Babin and Anderson, 2010). The following pairs had higher level correlations significant at  $p < 0.01$ : SIGNALS TOTAL and SOURCE DIVERSITY  $r = 0.68$ ; SOURCE DIVERSITY and SOURCE CRED VARIANCE  $r = 0.65$ ; SOURCE DIVERSITY and SOURCE CRED SUBSIDY  $r = 0.63$ ; SOURCE DIVERSITY and SOURCE CRED REVIEW  $r = 0.62$ ; SOURCE DIVERSITY and SOURCE CRED AWARDS  $r = 0.58$ ; SIGNAL TOTAL and SOURCE VARIANCE  $r = 0.58$ ; and SIGNAL TOTAL and SOURCE CRED SUBSIDY  $r = 0.53$ . A test statistic to check for multicollinearity between variables is the mean variance inflation factor (VIF). This statistic is the proportion of the variance per variable that is not predicted by other explanatory variables. In general, a VIF larger than 10 is indicative of multicollinearity between variables (Chatterjee, Hadi and Price, 2000). We calculated the VIF and our mean value was 1.84 (SOURCE DIVERSITY had the highest value of 5.20). These values provide additional evidence of independence between the variables.

Table 4.1 presents the regression estimation results. Model 1 includes our control variables, among which the dummy variable for affiliation before graduation (AFF\_BEFORE\_GRAD) has a positive and significant effect; signals before graduation (SIGNALS\_BEFORE\_GRAD) also have a positive and significant effect. The variable measuring the sum of the total number of signals after graduation (SIGNAL TOTAL) has a positive and significant effect, showing that each additional signal increases the likelihood to enter an affiliation by 5 percent ( $p < 0.10$ ). The dummy variable measuring the exogenous shock of the 2008 financial crisis is negative and significant, indicating that affiliating with an art gallery during and after the crisis was more difficult than affiliating before 2008.

Model 2 estimates the average credibility of third party sources transmitting each kind of signal. In this model, two of the four explanatory variables have a positive and significant effect on affiliation: namely, a one-point increase in the average credibility of sources issuing awards (SOURCE\_CRED\_AWARD) leads to a 29 percent increase in the hazard rate ( $p < 0.001$ ). Similarly, a one-point increase in sales (SOURCE\_SALES) increases the hazard rate by 20 percent ( $p < 0.05$ ). The average credibility of third party sources transmitting review (SOURCE\_CRED\_REVIEW) and subsidies (SOURCE\_CRED\_SUBSIDY) are positive but do not have a significant effect on affiliation with an art gallery.

In Model 3, we add the diversity of sources (SOURCE\_DIVERSITY) to the list of predictors: the effect is positive and significant, namely, going from maximal concentration to maximal diversity increases the likelihood to have an affiliation by 360 percent ( $p < 0.001$ ). In model 4, we add the variance of source credibility (SOURCE\_CRED\_VARIANCE), which is not significant. In model 5, we included both signal diversity (SOURCE\_DIVERSITY) and source credibility variance (SOURCE\_CRED\_VARIANCE). These results show that going from maximal concentration to maximal diversity increases the likelihood of having an affiliation by 408 percent ( $p < 0.001$ ); source credibility variance is not significant. And lastly, in Model 6 we include all variables. The variable measuring source credibility of third party sources transmitting awards (SOURCE\_CRED\_AWARD) is significant and positive; this means that a one-point increase in average source credibility of awards leads to a 17 percent increase in the hazard rate ( $p < 0.10$ ). The variable SOURCE\_DIVERSITY is significant and positive; this means that a one point increase in going toward maximal diversity leads to a 370 percent ( $p < 0.001$ ) increase in the likelihood of having an affiliation. These results provide empirical evidence to accept H1 and partially accept H2.

**TABLE 4.1** Cox proportional hazard estimate of the first affiliation with an art gallery

	(1)	(2)	(3)	(4)	(5)	(6)
AGE	0.999 (0.000)	0.999 (0.000)	0.999 (0.000)	0.999 (0.000)	0.999 (0.000)	0.999 (0.000)
GENDER	1.130 (0.235)	1.203 (0.248)	1.115 (0.229)	1.186 (0.249)	1.113 (0.228)	1.170 (0.244)
VISUAL ART	1.338 (0.312)	1.443 (0.328)	1.300 (0.293)	1.425 (0.329)	1.287 (0.291)	1.390 (0.319)
PHOTO	1.181 (0.347)	1.191 (0.362)	1.185 (0.347)	1.191 (0.358)	1.194 (0.353)	1.285 (0.390)
AFF_BEFORE_GRAD	2.204*** (0.501)	2.308*** (0.525)	2.158*** (0.493)	2.389*** (0.552)	2.132** (0.461)	2.196** (0.512)
SIGNALS_BEFORE_GRAD	1.159* (0.087)	1.131* (0.091)	1.109 (0.088)	1.131 (0.091)	1.107 (0.088)	1.130 (0.093)
AFF_AFTER_2008	0.107*** (0.021)	0.119*** (0.025)	0.120*** (0.023)	0.119*** (0.025)	0.122*** (0.022)	0.119*** (0.256)
SIGNALS TOTAL	1.047** (0.199)	0.986 (0.290)	0.989 (0.276)	0.984 (0.310)	0.986 (0.290)	0.985 (0.031)
SOURCE_CRED_REVIEW		1.120 (0.086)		1.117 (0.086)		0.990 (0.089)
SOURCE_CRED_AWARD		1.286*** (0.089)		1.284** (0.093)		1.168* (0.096)
SOURCE_SALES		1.204** (0.103)		0.203* (0.107)		1.099 (0.104)
SOURCE_CRED_SUBSIDY		1.016 (0.061)		1.037 (0.070)		0.935 (0.073)
SOURCE DIVERSITY			4.598*** (1.802)		5.084*** (0.867)	4.707** (2.894)
SOURCE CRED VARIANCE				1.026 (0.145)	0.906 (0.206)	0.889 (0.134)
N	422	422	422	422	422	422
Log-Likelihood	-588.82	-580.85	-583.49	-580.85	-582.73	-577.77

Coefficients significance tests are two-tailed: \*p<0.1; \*\*p<0.05; \*\*\*p<0.001.

#### 4.6 ADDITIONAL ANALYSES

Additionally, we conduct two extra estimations: First, we estimate the likelihood of entering an affiliation with a highly credible art gallery. For this purpose we use competing-risks models, as these allow us to estimate the likelihood of artists to experience mutually exclusive events. Second, we estimate the effect of predictors upon the time it takes to enter an affiliation. Specifically, we use accelerated failure-time (AFT) models. This estimation requires us to specify a probability density function for the baseline hazard. The non-parametric analysis of our dependent variable indicates that approximately 80 percent of the artists that affiliate do so within five years after graduation, and the rate of affiliations decreases as the observation time increases. This suggests that a sizable number of artists enter an affiliation early on, while other artists take longer or never affiliate. A log-logistic distribution may be particularly suitable to model an event that is relatively likely to happen early, and progressively less likely to happen thereafter. Thus, we specify this distribution in our parametric models. (These models are available upon request).

Using the Cox models adapted for competing risks, we estimate the likelihood of an artist to have an affiliation with a high-credibility art gallery versus the likelihood to have an affiliation with a low-credibility art gallery, or no affiliation at all. The proportion of artists who experience such outcome, compared to the alternative, is 23 percent. None of our explanatory variables are significant; only the control variable measuring the exogenous shock of the 2008 financial crisis (AFF\_AFTER\_2008) is negative and significant. We checked the reliability of these results conditional on the proportional hazards assumption underlying Cox models. This assumption entails that two strata with arbitrary values for the covariates have constant relative hazard: we check this assumption formally by performing the Therneau-Grambsch test of non-zero slope after each regression, and by examining the plots of Schoenfeld residuals. Because none of the tests rejects the proportional hazards assumption, and the plots of residuals show no specific pattern, we infer that these Cox model estimates are consistent.

The results of our AFT regressions using the log-logistic distribution show that having an affiliation before graduation (AFF\_BEFORE\_GRAD) reduces the time for a gallery affiliation after graduation by 88 percent (p<0.001). However, after the 2008 financial crisis compared to before, there is an increase in time to event of 87 percent (p<0.001). The average credibility scores of third party sources issuing awards (SOURCE\_CRED\_AWARD) have a negative effect; this means that a one-point increases in the average scores reducing the time-to-event by 15 percent (p<0.05). And finally, source diversity (SOURCE\_DIVERSITY) decreases the average time-to-event: specifically, maximal diversity means that the time it takes to have an affiliation decreases by 45 percent (p<0.01), compared to maximal concentration.

## 4.7 DISCUSSION AND CONCLUSION

In this paper, we focused on third party sources transmitting signals about nascent entrepreneurs, and studied the extent to which the credibility and diversity of these sources affected core mediators' decisions to affiliate with competitors during their nascent stage of competitive activity, thereby ending their nascency, and granting them full and legitimate entry in the relevant market.

In general, the literature on the effects of third party signals has primarily analyzed the effects of signals coming from the same kinds of sources on performance outcomes immediately following the signals. This study looked at the first affiliation with a core mediator. Whether a competitor achieves such an affiliation at all has a substantial effect on eventual performance, but can also be considered a performance outcome by itself. Instead of just looking at one kind of signal sources, for instance reviews or awards, we looked at the widest range of relevant sources of these evaluative signals. At the same time we used two general concepts, credibility and diversity of the sources, to structure our analysis of the effects of signals.

Source credibility as such is taken into account in earlier studies on signals (Sternhal, Dholakia and Leavitt, 1978; Pornpitakpan, 2004). This study contributed to this literature not just by looking at the effects of source credibility on a particular outcome, the affiliation with the core mediator, but also by systematically looking at source credibility per kind of source, as well as the effects of the diversity in the credibility of sources signaling about a particular competitor. With regard to diversity we took a multi-dimensional approach. Signal sources can of course be diverse in many ways, but in this paper we focused on two: (a) kinds of third party sources and (b) credibility levels of each kind of source. The diversity in kinds of sources can be important because these kinds represent the major different economic actors who play very different socio-economic roles and are assumed to have very different perspectives on quality. If source credibility has a strong effect on observers, it stands to reason that diversity of source credibility could also have an effect. Diversity along both dimensions could help observers to discount possible biases of certain kinds of evaluators or evaluators of particular credibility levels and thereby gain more confidence in the aggregate picture presented by the quality signals they observe about the focal competitors.

While there is a voluminous literature on legitimacy and the process of achieving legitimacy, the determinants of achieving legitimacy as a concrete event have not been studied quantitatively. Also, while there is much literature on the role mediators, evaluators and dominant external stakeholders play in determining a venture's competitive performance in various stages of its activity and also on the effect of third party signals on the competitor's reputation and, in turn, performance [e.g. Pollock, Porac and Wade, 2004; Pollock et al., 2010; Rao, 1994; Gulati and Higgins, 2003], no earlier studies have focused on source diversity as a determinant to influencing core mediators, whose decisions allow new entrepreneurs to exit nascency.

Our two hypotheses are largely supported. Our results showed that highly credible third party sources transmitting awards, and past sales, influenced core mediators more than third party sources transmitting the same signals but with lower levels of credibility, while the source credibility effects of media outlets publishing reviews and of institutions granting subsidies were not significant, though still positive.

Our results also showed that in general, source diversity has a substantive effect on core mediators. Specifically, the diversity in respect to the kinds of sources had a strong and significant effect, over and above the effects of the individual signals; however, the effect of diversity in source credibility was not significant. Greater diversity in kinds of sources does seem to provide core mediators additional confidence in their perception of the underlying quality of the nascent entrepreneurs, functioning as a strong aggregate quality indicator. The lack of a significant effect of variance in source credibility suggests that this type of diversity does not help as much to offset possible biases linked to particular characteristics of individual evaluators. The underlying reason for this could be that core mediators in this market, in which status and expertise are highly linked, expect low credibility evaluators to eventually fall in line with the high credibility evaluators.

Our study contributes to the literature on nascent entrepreneurship by focusing on the mechanisms of crossing the boundaries of the nascent stage. In a more general sense, this approach can be helpful to better understand life cycle stages. As Levi & Liechtenstein (2010) show there is very little consensus about stages that can be described in terms of particular characteristics of competitors in that stage. Life cycle models could become more useful to analyze competitive performance and industry dynamics by focusing on the boundaries and especially the economic processes that allow or force competitors to proceed from one stage to the next. We also contribute to the literature on legitimacy and signals, and especially their interrelations. Most studies on how legitimacy is acquired have been qualitative, while this study attempts to understand quantitatively and at a more detailed level how different signals transmitted by different third party sources with different levels of credibility affect the decisions that lead to the construction of legitimacy.

The setting of this study is the primary art market, which is a market that is known for its high degree of uncertainty about the quality of products and producers. The arguments and results of this paper seem valid for other markets where there are similar levels of uncertainty and where similar types of core mediators can be identified. In respect to the first aspect, it seems reasonable to assume that markets for search goods are less likely to have similar dynamics, because there the information provided by the competitors themselves can often provide a sufficient basis for decision making by other members of the relevant audience. In contrast, markets offering experience goods, e.g., tickets to the symphony, or credence goods, e.g., higher education, have greater uncertainty because pre-purchase quality evaluation is not possible (Nelson, 1970; Reinstein and Snyder, 2005; Darby and Karni, 1973). In respect to the second aspect, the most similar contexts would be those in which a particular type of retailer is the crucial gateway to a larger audience, for instance, supermarket chains (Kaufman, et al., 2006) or distributors vis-à-vis computer game developers (Broekhuizen, Lampel and Rietveld, 2013). In other industries particular types of media attention might help actors cross the legitimacy threshold; for instance, until recent developments of the Internet changed this, airtime on radio or television for releases was the strongest signal of legitimacy for a new record label or musician (Mol and Wijnberg, 2007).

This study has some obvious limitations. To start with, as argued, the setting is extremely suitable to study the effects of quality signals in a very uncertain environment and a clearly

identifiable core mediator, but at the same time, the competitors are all individuals, not organizations, and therefore we could not include any effects of signals that concern collectives of individuals, such as the founders of nascent firms (e.g. Certo, 2003; Ebbers and Wijnberg, 2011) or concerning the nascent organization as a whole. We analyzed the effects of source credibility of signals but not other possible characteristics of the signals, such as valence. However, in the context of our study the signals can be assumed to have positive valence. The work of a new artist is not reviewed or awards and merit-based subsidies are not given unless the evaluator thinks positively about the artist. We only studied one particular competitive environment and this set up did not allow us to analyze possible effects of the market dynamics on the likelihood of exiting from the nascent stage. It seems likely that the effect of signals in the nascent stage on the core mediator will also be moderated by, for instance, whether the target market is itself declining or growing rapidly. Also we focused on third party signals and did not include specific first party signals in our analysis. However, as we argued, we have good reasons to assume that precisely in the nascent stage the effect of third party signals will be relatively strong compared to that of first party signaling by not-yet legitimate actors.

Apart from studies that overcome these particular limitations, future research can build upon our findings in a couple of ways. First, we focused exclusively on the beginning of an actor's career. This restriction provided relatively reliable comparison between actors in the same stage of competitive activity and allowed us to isolate early career signals as determinants of being accorded full-fledged legitimacy. A useful extension to our study would be to investigate the future performance of the actor once the legitimacy threshold is crossed and to analyze whether the specific path towards legitimacy has long-lasting effects on that performance or whether the simple crossing of the legitimacy threshold "wipes the slate clean". Second, using signal diversity as a starting point, future studies could explore the sequences in which these diverse signals are received. For instance, precisely in the context of constructing legitimacy it could be useful to study whether sequences of signals that conform to audiences' expectations about such sequences convey more positive information about an actor than those that do not. In our dataset, the signals are temporally ordered by year, but investigations focusing on the sequences of signals would benefit from a much higher level of granularity, enabling to study sequences over weeks or even days. Special attention could also be given to the role of particular simple sequences as constituent parts of a complex sequence and differentiations could be made between recurrent or non-recurrent sequences (Abbott and Hrycak, 1990; Abbott, 1995). Third, the role of the core mediator could be further explored. Our study had a setting in which it was easy to identify the core mediator. However, other settings may be more ambiguous in this respect. There might be more than one core mediator, and some of them are market actors, such as the art gallery, while others can play a more formal role as certifying institutions. It would be of great interest to study what determines the relative contribution of different mediators to crossing the threshold and also what the consequences could be of being granted full market access by different kinds of core mediators.

## 4.8 APPENDIX

### APPENDIX A: Correlation Matrix

	mean	min	max	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.
1. AGE	140	24	76	1.0000													
2. GENDER	0.37	0	1	0.0430	1.0000												
3. VISUAL_ART	10.53	0	1	0.0491	-0.0666	1.0000											
4. PHOTO	10.15	0	1	-0.0229	0.0161	-0.4474	1.0000										
5. AFF_BEFORE_GRAD	10.16	0	1	-0.0243	0.0841	0.0357	-0.0866	1.0000									
6. SIGNALS_BEFORE_GRAD	10.18	0	7	0.0760	0.1051	-0.0246	-0.0350	0.1677	1.0000								
7. AFF_AFTER_2008	10.88	0	1	-0.1210	0.0424	0.0098	-0.0503	0.0246	0.0047	1.0000							
8. SIGNALS_TOTAL	12.81	0	30	-0.0213	-0.0667	-0.0732	0.0413	0.0889	0.1626	-0.0428	1.0000						
9. SOURCE_CRED_REVIEW	12.31	0	5	0.0430	-0.1032	0.0034	0.0690	0.0649	0.1415	-0.0506	0.4912	1.0000					
10. SOURCE_CRED_AWARD	12.15	0	5	-0.0432	-0.0577	-0.0522	0.0533	0.0571	0.1128	-0.1681	0.4095	0.2339	1.0000				
11. SOURCE_SALES	10.14	0	4	-0.0097	0.0183	0.0319	-0.0460	0.0174	0.0637	-0.0516	0.2484	0.0778	0.1178	1.0000			
12. SOURCE_CRED_SUBSIDY	13.28	0	4	-0.0412	-0.0047	-0.0301	0.0591	0.0957	0.1571	-0.1760	0.5388	0.2562	0.2463	0.0948	1.0000		
13. SOURCE_DIVERSITY	10.33	0	1	-0.0209	-0.0438	-0.0352	0.0464	0.1633	0.2137	-0.1478	0.6820	0.6167	0.5825	0.2863	0.6342	1.0000	
14. SOURCE_CRED_VARIANCE	10.50	0	2.77	0.0647	-0.0021	-0.0674	0.0644	0.0941	0.1233	-0.0474	0.5801	0.5060	0.4030	0.1794	0.3462	0.6521	1.0000

N=422

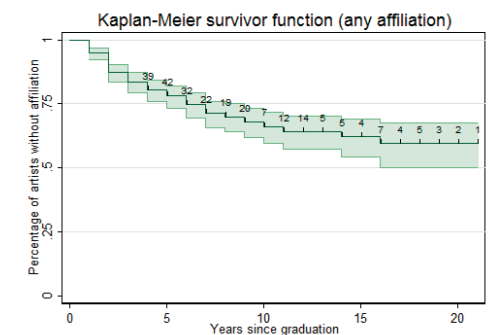
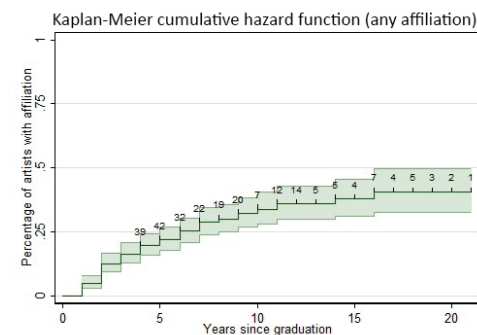
Source credibility means scores per signal kind if positive

### APPENDIX B: Kaplan-Meier estimation of the survivor and cumulative hazard functions

In the survival analysis, we start with a Kaplan-Meier estimation of the survivor and cumulative hazard functions. This is a non-parametric estimation based on the number of observations (individuals) that can experience the event at every point in time: the instantaneous hazard is based on the amount of observations that experience the event over the total number of possible observations. The individual hazard functions may be stacked into a cumulative hazard curve, as in Figure a. The survivor function, presented in Figure a, constitutes the inverse of the cumulative hazards. The small lines perpendicular to the Kaplan-Meier curves represent the points in time where observations are censored, meaning they exit the risk pool without experiencing either event, e.g., because observation was discontinued at data collection.

Figure a

Figure b



## CHAPTER 5

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### **SEQUENCES AND CONSEQUENCES:**

The effects of the first sequence of signals from high credibility  
third party sources on long-term sales performance

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## ABSTRACT

In markets with uncertainty about product quality, signals from third party sources received at the start of competitive activity can help producers overcome the liability of newness and achieve subsequent financial success. We determine the level of credibility of third parties and distinguish between two types of sources – those with financial stakes in the success of the producer who is the subject of the signal, and those without. We show that the temporal ordering of the first sequence of signals originating from different types of highly credible third party sources has an effect on long-term sales performance. However, our study also suggests that the addition of source credibility is not commutative, due to different penalty costs for the two types of sources if the signals transmitted are erroneous.

### Keywords

*the liability of newness, quality signals, sequences of signals, source credibility*

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## 5.1 INTRODUCTION

The consequences sequences of signals may have on producers' future performance have been understudied in the social sciences. This is surprising because a sequence of signals, especially the temporal ordering of the signals in the sequence, may provide a better understanding of performance outcomes over and above the main effects of individual signals or moderation effects between signals. We build on previous studies about sequences in sociology (Abbott, 1995; Zuckerman, Kim, Ukanwa and von Rittmann, 2003; Leung, 2014), psychology (Fredrickson and Kahneman, 1993; Kahneman, Fredrickson, Schreiber and Redelmeier, 1993; Ariely, 1998) marketing (Bhargava and Montgomery, 2013) and management (Rindova, Ferrier and Wiltbank, 2010) by looking at the consequence the first sequence of signals has on producers' future financial performance, and by focusing on these effects in the long run, not just immediately after the last part of the sequence has occurred.

In this paper, we contribute to the literature in management science in three ways: First, we focus on the temporal ordering of signals in a sequence and study if the addition of the second signal in a particular sequence is commutative or not. In other words, we explore if the order in which signals are received changes the effect a sequence has on producers' future financial performance outcomes. Sequences can be defined as a set of signals ordered within a temporal context, in which different kinds of signals transmitted by different kinds of sources comprise the sequence (Abbott, 1995). Signals are observable actions or events that provide customers with information about producers' latent or hard-to-observe quality (Spence, 1973). Earlier research has shown that signals are useful proxies of quality, and help reduce customers' uncertainty in pre-purchase decision-making.

Second, we focus on the first sequence of signals originating from highly credible third party sources received at the start of competitive activity. Third party sources are neither producers nor customers but rather act as intermediaries between the two (Sauder, 2006); based upon their specialized knowledge, they evaluate producers' quality and disseminate this information to a broader public (Sauder, 2006, Khaire, 2014). The constituent parts of source credibility are independence in making evaluations (Lampel and Shamsie, 2000; Pollock and Rindova, 2003) and penalty costs a third party source is willing to risk incurring if there is the belief that the quality information conveyed is incorrect (Spence, 1973; Ippolito, 1990; Bergh, Connelly, Ketchen and Shannon, 2014). We explore the role of the constituent parts of source credibility and study the extent to which source credibility of third parties helps producers' overcome the liability of newness (Stinchcombe, 1965) and achieve long-term financial success.

Third, not all signals originating from highly credible third party sources have the same effect on customer behavior. To gain a deeper understanding of the effectiveness of signals from highly credible third party sources, we make a distinction between the types of stakes these sources have in the future performance of the producer who is the subject of their signaling. Expanding on our understanding of the role of third parties, we distinguish between sources with a direct financial stake in the future success of a producer and those without. We add to management science literature by comparing the roles third party sources with different stakes have and the functions they perform, and how this may affect producers' future financial

outcomes. We pay close attention to the order of signals in a sequence transmitted by third party sources with different types of stakes; and study if costs of signaling, particularly penalty costs, affect the commutativity of the addition of source credibility.

The empirical setting of our study is the primary visual art market, where works of art are sold for the first time (Singer and Lynch, 1994). In this market, there is extreme uncertainty surrounding product quality, as there are no real objective measures of valuation (Caves, 2000). Artworks produced by artists just entering this market require considerable explanation and evaluation from third party sources with specialized knowledge about contemporary art, making this a particularly suitable setting to study the consequence of the first sequence of signals on producers' long-term sales performance. Within this setting we focus on a subset of visual artists, namely, the alumni from the Rijksakademie van beeldende kunsten (RABK) a visual arts residency program located in Amsterdam, the Netherlands. We construct a unique longitudinal database consisting of 471 alumni and analyze their signals, such as reviews, awards and gallery affiliations, received between 1986-2012. An expert panel determined the level of source credibility of 967 third party sources transmitting signals about these artists. We categorized sources as having either a financial or non-financial stake in the future success of the producer. Art galleries have financial stakes because of their monetary investments in artists they endorse at exhibitions or represent at art fairs, and media outlets publishing reviews and juries deciding award winners on behalf of organizations are categorized as sources without financial stakes.

In the next sections we review the literature on the liability of newness, signaling theory, source credibility and its constituent parts and sequences of signals. We further describe the database and present the results of our panel data regression analysis. Discussion, future research and limitations follow.

## **5.2 THEORETICAL FRAMEWORK**

### **5.2.1 Overcoming the liability of newness by external legitimation**

Stinchcombe (1965) introduced the concept of the liability of newness to help explain why new producers have higher rates of failure compared to established competitors. Stronger selection pressures are exerted on new producers and as a result failure is relatively high at the start of competitive activity (Singh, Tucker and House, 1986). New producers are at a competitive disadvantage because on the one hand they are susceptible to internal factors, such as their lack of experience, less developed professional networks, uncertainty about future resources (Stinchcombe, 1965; Carroll and Delacroix, 1982; Carroll, 1983; Freeman, Carroll, and Hannan, 1983) and on the other hand external factors, such as lack of endorsements and/or quality evaluations make them particularly vulnerable because of their lack of external legitimacy (Singh et al., 1986). They endure the hazards of inexperience and the lack of legitimacy while in competition with producers who no longer experience these hardships. Especially in markets with quality information deficiencies where customers have difficulties determining product quality by themselves – pre-purchase (Nelson, 1970) or post purchase (Darby and Karni, 1973) – the external factors are likely to result in exerting the strongest selection pressure on new producers (Singh et al., 1986).

Consequently, being the subject of quality signals from third party sources at the start of competitive activity is likely to significantly contribute to overcoming the negative effects associated with the liability of newness. Third party sources help generate customer awareness about producers and share their knowledge and expertise with customers to help them understand and discern product quality (Khaire, 2014). Customers pay close attention to the choices these sources make because they are believed to have access to superior information, compared to most customers' privately held information (Rao, 1994). It is important for new producers to be the recipients of signals from these sources because they help confer external legitimacy (Singh et al., 1986). Once a producer gains legitimacy, then it is more likely that the producer will be included in customers' consideration sets (Zuckerman, 1999). Producers are more likely to be included in customers' consideration sets when they receive favorable evaluations of acceptance based upon fitting in with existing norms, conventions and expectations of the group (Singh et al., 1986). Inclusion in a consideration set is essential because customers cannot process all alternatives in the market, and therefore usually limit their attention to competitors within a particular set. External legitimation can also have long-lasting effects, by helping to initiate other self-reinforcing mechanisms, such as the so-called Matthew effects (Merton, 1968), which can further increase the inequality between competitors. For a new producer this can mean that receiving signals from third party sources can be the start of a self-reinforcing mechanism that may lead to more signals from other sources, enhancing the competitive advantage of the focal producer.

### **5.2.2 Signals from highly credible third party sources**

In general, signaling theory (Spence, 1973) describes how quality signals can help differentiate between high and low quality producers based on a separating equilibrium, in which there is an inverse cost quality relationship that makes receiving (or transmitting) signals less costly for producers who are of higher quality compared to those of lower quality (Spence, 1973; Connelly, Certo, Ireland and Reutzel, 2011). In a recent overview of signaling theory in management literature, Bergh, Connelly, Ketchen and Shannon (2014) discuss how a separating equilibrium can also occur based upon differential penalty costs when third party sources signal about a producer. In this case the penalty costs, and the separating equilibrium, result from the perceived credibility of the source, when customers perceive the third party transmitting the signal about the producer to have unique abilities to recognize quality, and believe this source would not jeopardize this position by signaling about lower quality producers (Higgins and Gulati, 2003).

However, not all third-party sources are equally effective transmitters of signals; the signals from some sources have a stronger impact because they are deemed to be more credible. The management and marketing literature has shown that credible sources are more persuasive (Sternhal, Dholakia and Leavitt, 1978, Pornpitakpan, 2004), help create greater customer attitude change (Kelley, 1967; Eagly and Chaiken, 1975; Mizerski, Golden and Kernan, 1979) and influence decision making processes of customers more than their less credible counterparts (Washington and Zajac, 2005; Podolny, 1993).

Two constituent parts of source credibility are the independence of evaluations (Lampel and Shamsie, 2000; Pollock and Rindova, 2003) and penalty costs associated with transmitting

erroneous quality signals (Spence, 1973; Ippolito, 1990; Bergh et al., 2014). Source credibility, and the underlying components, has been shown to be important in high-risk markets, and particularly with reducing uncertainty caused by information deficiencies about producers' quality (Stuart et al., 1999).

### 5.2.3 Sequences of signals

At the start of competitive activity, a producer can be the subject of more than one third party signal, and even more than one signal originating from different third party sources with different levels of credibility and different stakes in the future success of the producer. These signals are in most cases not emitted conjointly but issued separately over time in particular sequences. The question arises whether the effect of adding one signal to another is commutative, or whether each particular temporal order of signals in a sequence has a different effect on the producer's future financial performance, and the addition is therefore non-commutative.

There is surprisingly little research about the effects of particular sequences. Some scholars analyzed sequences in career patterns and studied possible causes that give rise to particular sequences (Abbott, 1995; Zuckerman et al., 2003; Leung, 2014). Others, especially in the field of psychology and marketing, studied the consequences of sequences. Most of these studies were conducted in controlled experimental settings, where stimuli of one type, but at different levels of strength, were used and participant responses were measured immediately after exposure to the sequence (e.g., Fredrickson and Kahneman, 1993; Kahneman, Fredrickson, Schreiber and Redelmeier, 1993; Ariely, 1998; Bhargava and Montgomery, 2013). In the field of management science, Rindova, Ferrier and Wiltbank (2010) show that in nascent markets, different sequences of competitive actions by producers, which include announcing new product introductions and alliances, have different effects on how these producers are evaluated.

We build on these earlier findings by studying the effects of sequences of different kinds of signals originating exclusively from third party sources, as opposed to those originating from producers themselves (Rindova et al., 2010). In addition, we distinguish between third party sources with different types of stakes, and study the commutativity of the addition of source credibility with the second signal in the sequence. Finally, we look at these effects in the long run, not just immediately after the sequence has occurred. More specifically, we study whether particular sequences of signals from highly credible third party sources about producers in the early stage of their competitive activity will help these producers overcome the liability of newness and positively affect long-term sales performance. Particularly signals from third party sources that are highly credible are useful in helping to distinguish between producers' quality, and exactly this early differentiation between new producers may trigger mechanisms behind dynamic economic processes that lead to gain long-lasting competitive advantage.

## 5.3 EMPIRICAL SETTING

### 5.3.1 Contemporary visual art market

The empirical setting of this exploratory study is the primary visual art market, where works of art are sold for the first time (Singer and Lynch, 1994). This market is characterized as having

high unpredictability of economic success, particularly for new artists because of the extreme uncertainty surrounding their quality, and oversupply of products (Caves, 2000). Third party sources transmitting signals - who have specialized knowledge of art (Crane, 1989; Currid, 2007) - help customers overcome uncertainty, because they explain and evaluate the artworks they have signaled about. Third party sources transmitting signals about artists are important because they not only define but also collectively - and at the market level - determine quality, and thus help shape competitive successes and failures (Caves, 2000; Wijnberg and Gemser, 2000; Ginsburgh and Van Ours (2003); Hutter and Throsby, 2008; Prinz, Piening, and Ehrmann, 2015).

We focus on the career trajectories of artists who were residents at the Rijksakademie van beeldende kunsten (RABK), and who are active on the primary art market. RABK has a long history of excellence; it was established in 1870 by King Willem III as a classical art academy, focusing exclusively on teaching, both the technical and creative aspects of fine art disciplines, e.g., painting, drawing, and sculpture. However, RABK's focus shifted in the late 1980s from classical art training to an artists' residency program. As a residency program, it provides selected artists the unique opportunity to focus on artistic experimentation, innovation and critical discourse. The goal of this program is to select the most talented visual artists and offer them a platform where research, experimentation, innovation and critical discourse are central, and complemented with technical facilities, workshops, podia for artistic presentations and networking opportunities (Rijksakademie Annual Report, 2014).

During our observation period from 1986 up to and including 2012, the average age of an accepted applicant was 29 years old, and more than 95% have received a bachelor and/or master degree in fine arts or in a related discipline and have had between two to five years art practice experience. Although RABK does not offer an academic degree upon finishing the residency program, it does offer financial support and studio space so that residents can devote the two years of their residency to developing their art practice.

### 5.3.2 Sales to different categories of customers

There are different categories of buyers active on the primary art market, namely, corporate collectors, museums, and private art collectors. Corporate collectors are businesses engaged in commerce, who also collect art, but whose core activity is not preservation, research and communication of works of contemporary visual art (Weil 1990). Since the later 1980s, corporate collectors have had an increasing influence on setting the standards for recognizing and attributing value in the visual arts (Balfe 1987; Martorella 1990; Wu 2002). Historically, museum collections were important in determining the value of art based upon what art became institutionalized. But steadily corporate art collections (Wu 2002; Witte, 2008) and private collectors (Chen, 2009), albeit to a lesser extent, have been gaining authority to determine the value of art.

This is not surprising because most corporate collections, and exceedingly more private art collections<sup>40</sup>, are formed under the guidance of art experts (Wu 2002; Martorella 1990).

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<sup>40</sup> In this context, private art collectors are those who actively build an art collection and loan works to museums and other exhibition spaces.

The art curators who are self-employed or directly employed by corporations, and buy art on behalf of their client or employers, usually have advanced degrees in art history and extensive curatorial museum experience. These curators also move freely between building public, semi public and private collections (Martorella 1990). In doing so, they have helped legitimize many corporate and some private art collections authenticating them to museum art standards (Wu 2002; Martorella 1990; Chen, 2009; Witte, 2008).

Access to the curators of corporate art collections was facilitated through the Netherlands Association of Corporate Art Collections (VBCN). Thirty-five member organizations were approached and asked to participate in this study; 63% replied favorably and supplied sales data, i.e., price paid per artwork and date of purchase, about artists in their collection who were RABK residents from 1986 to 2012. The member organizations of the VBCN that participated in this study<sup>41</sup> account for 77% of the sales made to corporate collections in the Netherlands during our observation period (www.vbcn.com). The Stedelijk Museum Amsterdam and De Pont Museum in Tilburg supplied extensive sales data, i.e., price paid per artwork and date of purchase, again concerning artists in their collection who were RABK residents during the above mentioned observation period. The private collectors who participated in this study were either Dutch nationals or resided at least partly in the Netherlands. These private collectors were approached through snowball sampling; a core criterion for participation is that the private collectors purchase at least five new artworks annually at art fairs and art galleries. Most participants provided detailed listings of artworks they purchased from artists who had attended RABK during the observation period, including both sales price paid and date of purchase. In some cases, however, a price range was given, for which the average of that range was used.

## 5.4 EMPIRICAL STRATEGY

### 5.4.1 Model

We use fixed effects panel data regressions to analyze the effects of producers' first sequence of signals on their long-term sales performance. A fixed effects approach to analyzing longitudinal data is a useful specification because it captures individual time invariant unobserved heterogeneity while constructing a recursive structure by following individuals over time (Greene, 2003).

### 5.4.2 Variables

Our data originate from different sources. First, a complete sample of all alumni were retrieved from the Rijksakademie van beeldende kunsten (RABK); they actively track the careers of current and past residents by collecting publications, newspaper clippings, award records, reviews, listings of exhibitions and art fairs, magazine articles, and gallery information. Second, we verified and updated the accuracy of the extracted data by checking curricula vitae (CV), which we downloaded from artists' web site.

Most artists use their CV to provide a comprehensive listing of their professional history, including commercial achievements. Third, we collected sales data from corporate art collectors, museums, private art collectors and auction houses.

To make our data amenable to econometric analysis, we constructed a panel dataset using annual frequency. The unit of analysis is the individual. Our data is truncated, so we impose restrictions, described below, to balance these data. Since the focus of our study is on the effects of the first sequence of signals at the start of competitive activity on later sales performance, we divided the data into two distinct phases, namely, early and later competitive activity. The demarcation of the early phase was based upon consensus from our expert panel who agreed that signals received four years prior to starting RABK, two years during RABK, plus one-year after finishing RABK can be seen as being representative of a visual artist's early career phase. The later phase is simply the time period following the early phase, starting from one year after finishing until 2012, the end of our observation period. The dimensions of our panel data are  $T=26$  time periods (1986-2012) and  $N=471$  artists. We code sales, signals and sequences of signals as zero in years without a registered event. In other words, we assume that the individual was still active those years. We also assume that all artists have been active until 2012, i.e. the last year in our data. Furthermore, we code sales, signals and sequences of signals as zero for years before the start of RABK if no events occurred.

#### 5.4.2.1 Sales

The dependent variable in our study is later career sales, which is the sum of artists' annual sales in euros, starting one year after graduation up to the end of the observation period. We use this operationalization because the aim of our study is to estimate the effects of early career sequences of signals on later career sales performance. The dependent variable consists of sales data from different categories of customers, namely, museums, corporate collectors and private art collectors. These customers purchased the artworks either on the primary art market, i.e., directly from the artist or through an art gallery, or on the secondary art market at an art auction. Next, we took the log-transformation of the dependent variable, thereby changing the scale of our data by pulling outliers from the positively skewed distribution closer to the rest of the data. We added one to each log-transformation of sales in order to avoid the logarithm of a null value.

#### 5.4.2.2 First sequence of signals

Our explanatory variables are *first sequence of signals* from high credibility third party sources with and without financial stakes in the future performance of the subject of the signals. Signals from third party sources without financial stakes (labeled as NF for non-financial) are reviews in media outlets and awards from selection committees.

<sup>41</sup> Members of VBCN that participated in this study: ABN AMRO, Achmea, Aegon, Ahold, AkzoNobel, AMC, DNB Bank, DSM, Erasmus MC, ING Bank, KPMG, KPN, LeasePlan, LUMC, OCE, Provincie Limburg, RaboBank, Rabo Vastgoed-groep, Sanquin, Stichting Beheer SNS Real, Theodoor Gilissen, and UMC.

Reviews<sup>42</sup> are either in art journals or national/ international newspapers and are broadly interpreted as anything from a discourse about an artist's oeuvre to critiquing national and international exhibitions. Awards range from Dutch national art awards such as the Prix de Rome to internationally recognized art awards such as the Turner Prize. Although jury members and critics can derive reputational benefits, e.g., being the first to discover a new star talent, from the awards they bestow and reviews they write, a gallery owner is often not only exclusively interested in the artistic contribution and potential of the artist but also in the evolving art market and financial gains to be made. As such, gallery owners are both promoters and service providers because they select artists, monitor their professional development and convey signals about them to the public, while also selling the artworks to art collectors (Velthuis 2003). One of the strategies an art gallery can use to promote artists is to attend annual art fairs. Art Basel, Frieze, and Artissima are examples of international art fairs that provide selected art galleries a platform to exhibit artists and to sell artworks to collectors as well as promote these artists to museum representatives, curators and art critics (Yogev and Grund, 2012). We operationalize affiliation as an artist's association with a gallery at an art fair and an exhibition at an art gallery. Earlier research has shown that affiliations signal quality (e.g., Jensen 2003) by the suggestion to buyers that the producer is worthy of the association (Khaire 2010).

We distinguish between third-party sources with and without a financial stake in the future career of an artist. First, sources without a financial stake are media outlets in which reviews of the artists' work appear and organizations represented by juries who nominate and select award winners. Second, sources with a financial stake are those that can directly profit financially from the sales of artworks. In our dataset, these third party sources are commercial art galleries and the signals from these sources are solo-exhibitions at a gallery and an artist's affiliation with a gallery at art fairs.

The variables are dichotomous and indicate the stake – financial (F) or non-financial (NF) – from high (H) credibility third party source transmitting signals. Third party sources that received a source credibility score of 5, 4 or 3 from the expert judges were included in the high credibility category. If a signal from a high credibility third party source with a financial stake precedes a signal from a high credibility third party source without a financial stake then this is coded F-H\_NF-H and a value of one is assigned, otherwise zero. If the first sequence is the reverse, namely a signal from a high credibility third party source without a financial stake followed by a signal from a high credibility third party source with a financial stake then this is coded NF-H\_F-H and a value of one is given, otherwise zero. If there is no sequence of signals in a given year, then a zero was assigned. For instance, if one artist had an affiliation with a highly credible gallery in t=1, followed by a review from a highly credible media outlet in t=2 then the first sequence of signals for this artist would be F\_H-NF\_H, and recorded in t=2.

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<sup>42</sup> A longitudinal study on the valence of reviews by art critics showed that 9 out of 10 critics wrote positive reviews (see: *The Visual Arts Critic: A Survey of Art Critics at General Interest Publications in America*, New York: National Arts Program - Columbia University, 2002; Elkins, 2003). Based on this research, we do not control for the valence of reviews, nor of the other signals, as neither awards nor gallery affiliations can ever be considered to express anything but positive valence.

The granularity of our data is annual, and in 7 cases we could not identify the actual temporal sequence of signals occurring because signals from high credibility third party sources with - and without - financial stakes were received in the same year. To avoid problems due to reverse causality, we excluded these 7 cases from the main analysis. However, we conducted a sensitivity analysis (available upon request) with these cases included; the results were comparable to the main model.

#### *5.4.2.3 Measuring credibility of third party sources*

We use a multi-item scale measuring source credibility (Ohanian, 1990) and asked a panel of judges to score 967 third party sources transmitting signals about the visual artists in our sample population on six scale items: trustworthiness, honesty, dependability, experience, knowledge and expertise. Our panel of experts consisted of a visual artist, a curator, and one of the authors. First, 200 third party sources were rated on a 5-point Likert for the answer categories: strongly agree, agree, neither agree or disagree, disagree and strongly disagree. If the judges did not know the source and could not provide a rating based upon a quick Internet search, then 'do not know source' option could be checked. The internal validity of the six items measured for these 200 sources had a Cronbach's alpha of 0.98, and the inter-rater reliability between the three judges using a two-way random effects intraclass correlation coefficient was (ICC 2,3) 0.744,  $p < 0.001$ . Intra class correlation coefficient (ICC) is used to measure the consistency of measurements given to the same source by different judges. We used a two-way random effects ICC model with absolute agreement between judges per source. Absolute agreement refers to the correlation between measurements and it is also a ratio of the between target variance to the total variance of measurements in the model (Shrout and Fleiss, 1979). The literature concedes that an ICC value of 0.70 or higher is acceptable, indicating the judges' ratings to be internally consistent, suggesting low random and specific errors (Bravo and Potvin, 1990). Second, based upon the high internal validity and internal consistency between the judges, the third judge continued rating the remaining 560 sources, using the multi-item source credibility scales developed by Ohanian (1990).

#### *5.4.2.4 Control variables*

We include a number of time-varying covariates. First, we included the variables COUNT\_F and COUNT\_NF that measure the annual cumulative count of early signals originating from third party sources with a financial stake (F) or a non- financial stake (NF). Second, we include two continuous variables AVE\_CRED\_F and AVE\_CRED\_NF, which measure the average credibility of third party sources with a financial stake (F) or a non-financial stake (NF) transmitting signals about a focal artist per year.

Third, we also include the first sequence of signals from third party sources with different levels of source credibility. The variables NF-H\_F-L and NF-L\_F-H indicate that the first sequence of signals originate from a third party source without financial stakes in the future success of the producer followed by a third party source with financial stakes; the credibility of these sources can be high (H) or low (L). Along the same lines, the variables F-H\_NF-L and F-L\_NF-H indicate the first sequence of signals originate first from a third party source with a

financial stakes followed by a third party source without; again, the credibility of these sources can be high (H) or low (L). We also include the variables NF-L\_F-L and F-L\_NF-L in which the order of the stake of the third party sources transmitting the signals in the first sequence can be non-financial (NF) or financial (F), but the source credibility levels are low (L). We include these variables to control for the possibility that signals from sources with different credibility scores or low credibility scores may have an effect on producers' long-term sales because of network effects (e.g., Granovetter, 1973; Giuffre, 1999), which have been shown to positively affect artists' long-term financial outcome (Becker, 1974).

Lastly, we include biographic variables measuring gender (1 equals female), nationality (1 equals Dutch), and artistic disciplines: drawing, installation, painting, photography, sculpture, video/film and miscellaneous, which is a basket category for other disciplines such as graphics and animation. These variables are dummy variables and in our models we use miscellaneous as our base category.

## 5.5 RESULTS

### 5.5.1 Summary Statistics

In the later career phase, 215 individuals had at least one career sale, which included 103 sales transactions. The maximum price paid for an artwork in this phase was €1,101,981 and the minimum € 15.88 with a mean price of € 24,235.24. In the early career period, the average number of signals from third party sources without a financial stake (COUNT\_NF), if positive was 4.13 (minimum equaling one and the maximum 40) and the average source credibility score (AVE\_CRED\_NF) was 2.70 on a 1 (low credibility) to 5 (high credibility) scale. The average number of signals from third party sources with a financial stake (COUNT\_F) if positive was 1.77 (minimum equaling one and the maximum 9) and the average source credibility score (AVE\_CRED\_F) was 2.87 on a 1 (low credibility) to 5 (high credibility) scale. In short, 39.11% of our sample population had at least one early career signal from a highly credible third party source without a financial stake and 20% had at least one early career signal from a highly credible third party source with a financial stake. These descriptive results show that signals transmitted by third party sources without a financial stake in the future success of the artist, e.g., reviews printed in media outlets and award winner selected by committees, occur more frequently than getting a signal from a third party source with a financial stake in the future success of the artists, e.g., and exhibition at an art gallery.

Regarding sequences of signals, 139 individuals had an early career sequence: Of those, 62 individuals had signals from highly credible third party sources, namely 37 artists had the sequence NF-H\_F-H and 25 the sequence F-H\_NF-H. When we included high and low credibility levels of third party sources, 57 individuals had a mixed first sequence: 16 artists had NF-H\_F-L, 19 had NF-L\_F-H, 5 had F-H\_NF-L, and 17 had F-L\_NF-H. Finally, 20 individuals in our sample population had a sequence of signals from third party sources with low levels of credibility, namely: 15 artists had NF-L\_F-L and 5 artists had F-L\_NF-L. We conducted an F-test to check if the coefficients of the explanatory sequences of signals and the sequences used as control variables are simultaneously equal to zero. The results from the F test 78.36

( $p < 0.001$ ) showed that we could reject the hypothesis of no differences between the sequences. This means that the regression coefficients between the sequences do indeed significantly differ from one another across the cohorts.

The correlation matrix in Appendix A presents pairwise correlations for our explanatory variables. The matrix shows that the correlation between two pairs of independent variables is above 0.50, which may indicate collinearity between each pair (Hair, Black, Babin and Anderson, 2010); namely Count NF and Ave Cred NF ( $r = .57$ ,  $p < .001$ ) and Count F and Ave Cred NF ( $r = .73$ ,  $p < .001$ ) exceed this threshold. To check for possible collinearity among these variable we calculated the mean variance inflation factor (VIF). This value was 1.71 (Ave Cred F had the highest value of 3.41). VIF is a statistic available to detect collinearity; and it represents the proportion of the variance that is not predicted by other independent variables. In general, a VIF larger than 10 is indicative of collinearity between variables (Chatterjee, Hadi and Price, 2000). Our values are well under this threshold, providing additional evidence of independence between the variables. Additionally, we conducted a modified Wald test for group-wise heteroskedasticity in fixed effect regression models, which suggested that variability might be unequal across values. To ensure that our estimates robust, we estimated robust clustered standard errors adjusted for heteroskedastic variance of the error term (White, 1980).

We chose a conservative approach to ensure collinearity between variables was not causing estimation problems such as inflated standard errors for the correlated variables and suppressing significance. We estimated models where each of these variables from the correlated pairs was included step wise. On the model level, multicollinearity did not seem to effect the direction of our coefficients or significance of our variables of interest as we added more variables to the fixed effects panel data models. This provided extra evidence that the higher order correlation between these pairs of variables does not affect our parameter estimates (Hair et al., 2010).

### 5.5.2 Explaining late sales by first sequences of signals

The results of our analysis are presented in Table 5.1. In model 1, our baseline model, we include the time varying control variables, namely the number of signals from third party sources with a financial stake in the future success of the subject of the signals (COUNT F) and the number of signals from third party sources without a financial stake in the future success of the subject of the signals (COUNT NF). Across all models, we included time invariant variables, such as: gender and nationality as well as artistic discipline. In model 2 we added the control variables measuring the annual average credibility level of third party sources from which the early signals originate. We distinguished between the annual average credibility level of third party sources with a financial stake in the future success of the subject of the signals (AVE\_CRED\_F) and those without (AVE\_CRED\_NF). The results from these two models show that there is a robust positive association between the number of early signals and their average credibility and later career sales.

In model 3 we added the sequence variables to test the effects of the temporal order of the first sequence of signals on the long-term performance of new producers. The results from the fixed effects estimation show that a sequence in which a signal from a highly credibility third

party source with a financial stake, precedes a signal from a highly credibility third party source without a financial stake, F\_H – NF\_H (1.276,  $p < .001$ ), has a positive and significant effects on producers' long-term sales performance. The reverse sequence, NF\_H – F\_H (0.538,  $p < .01$ ), is also positive and significant but the effect is less than half as strong as compared to the other sequence.

In model 4, we made a distinction between low and high credibility of third party sources transmitting signals for third party sources with and without a financial stake. In this model, the focal explanatory variables, F\_H – NF\_H (1.346,  $p < .001$ ) and NF\_H – F\_H (0.641,  $p < .01$ ) have a significant and positive effect on producers' long-term sales performance but the other permutations of the sequences are not significant.

**TABLE 5.1** Explaining late sales (log) by first sequence of signals

	(1)	(2)	(3)	(4)
COUNT NF	0.247*** (0.036)	0.076 (0.047)	0.042 (0.048)	0.073 (0.053)
COUNT F	0.036*** (0.010)	0.016 (0.010)	0.020 (0.010)	0.018 (0.011)
AVE CRED NF		0.094*** (0.024)	0.052* (0.025)	0.048 (0.026)
AVE CRED F		0.165*** (0.033)	0.094* (0.037)	0.055 (0.042)
NF-H_F-H			0.538** (0.189)	0.641** (0.215)
F-H_NF-H			1.276*** (0.208)	1.346*** (0.231)
NF-L_F-L				0.041 (0.247)
F-L_NF-L				-0.504 (0.369)
NF-H_F-L				-0.456 (0.245)
NF-L_F-H				0.581 (0.248)
F-H_NF-L				-0.891 (0.463)
F-L_NF-H				0.293 (0.251)
N	9900	9900	9900	9900
Control var	yes	yes	yes	yes
pseudo R2	0.0561	0.0608	0.0651	0.0668

Robust clustered standard errors in parentheses  
 $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.00$

## 5.6 ADDITIONAL ANALYSES

We conducted a few additional analyses to check the robustness of our main models by imposing the following restrictions: First, we changed the operationalization of highly credible third party sources to include only those sources that received a score of a 5 or 4 from our panel of experts, and third party sources who received a score of 3, 2 or 1 were operationalized as low credibility sources. Second, while keeping the early career phase for all cohorts at 7 years, we shortened the later career phase to include only two years after the first year of graduation. Hence, the observation period was 9 years for all cohorts. Third, we further shortened the observation period to 5 years. Here we restricted the early career phase to the first two years at RABK plus one year after graduation and the later career phase was restricted to two years after graduation.

Table 5.2 presents the results of the analysis where high credibility third party sources received a score of 5 or 4, and low credibility third party sources received a score of 3, 2, or 1. Similar to our previous results, the sequence of signals F\_H – NF\_H (0.674,  $p < .01$ ) has a positive and significant effect on producers' long-term sales performance in model 3 and model 4. This robust result supports our earlier results, confirming that this sequences positively affects producers' long-term financial performance outcomes. Additionally, the following sequences also have a significant and positive effects on long term sales performance: NF\_L – F\_H (0.612,  $p < .05$ ), F\_H – NF\_L (1.053,  $p < .01$ ), and F\_L – NF\_H (0.946,  $p < .001$ ). Presumably, the change in operationalization is driving these results.

Table 5.3 presents the results of the analysis where the observation period for all cohorts was 9 years. These results are similar to our previous findings, namely, the explanatory variable F\_H – NF\_H in model 3 and model 4, again have a significant and positive effect on producers' long-term sales. The other explanatory variable NF-H\_F-H is significant in model 4 at 10%. In short, balancing the panel to include the same number of year observations for all cohorts (9 years) provides similar results supporting our main findings in Table 5.1. Similarly, when we shortened the observation period to 5 years - hence, no signals prior to starting RABK were included - the sequence F-H\_NF-H remained significantly and positively associated to late sales (log); the other explanatory variable NF-H\_F-H was not significant. (Table available upon request).

**TABLE 5.2** Explaining late sales (log) by first sequence of signals with high credibility restriction

	(1)	(2)	(3)	(4)
COUNT NF	0.247*** (0.036)	0.076 (0.047)	0.130** (0.050)	0.095 (0.052)
COUNT F	0.036*** (0.010)	0.016 (0.010)	0.019 (0.011)	0.017 (0.011)
AVE CRED NF		0.094*** (0.024)	0.084*** (0.025)	0.055* (0.026)
AVE CRED F		0.165*** (0.033)	0.131*** (0.035)	0.073 (0.042)
NF-H_F-H			0.190 (0.271)	0.549 (0.294)
F-H_NF-H			0.674** (0.258)	1.035*** (0.280)
NF-L_F-L				0.052 (0.178)
F-L_NF-L				-0.533 (0.252)
NF-H_F-L				-0.426 (0.307)
NF-L_F-H				0.612* (0.239)
F-H_NF-L				1.053** (0.389)
F-L_NF-H				0.946*** (0.255)
N	9900	9900	9900	9900
Control var	yes	yes	yes	yes
pseudo R2	0.0561	0.0608	0.0628	0.0655

Robust clustered standard errors in parentheses  
\* p<0.05, \*\* p<0.01, \*\*\* p<0.001

**TABLE 5.3** Explaining late sales (log) by first sequence of signals with time restriction

	(1)	(2)	(3)	(4)
COUNT NF	0.389*** (0.048)	0.331*** (0.064)	0.294*** (0.065)	0.302*** (0.068)
COUNT F	0.019 (0.014)	0.011 (0.014)	0.012 (0.014)	0.008 (0.014)
AVE CRED NF	0.059* (0.027)	0.014 (0.029)	0.047 (0.028)	0.013 (0.031)
AVE CRED F	0.043 (0.037)	0.003 (0.041)	-0.081 (0.042)	-0.028 (0.046)
NF-H_F-H			0.323 (0.213)	0.435+ (0.237)
F-H_NF-H			1.060*** (0.238)	1.138*** (0.255)
NF-L_F-L				-0.180 (0.343)
F-L_NF-L				-0.112 (0.449)
NF-H_F-L				-0.342 (0.294)
NF-L_F-H				0.489 (0.269)
F-H_NF-L				-0.815 (0.773)
F-L_NF-H				0.132 (0.274)
N	4115	4115	4115	4115
Control var	yes	yes	yes	yes
pseudo R2	0.0794	0.0810	0.0864	0.0927

Robust clustered standard errors in parentheses  
+ p<0.10 \* p<0.05, \*\* p<0.01, \*\*\* p<0.001

## 5.7 DISCUSSION AND CONCLUSION

### 5.7.1 Summary of contributions

Our exploratory study shows that especially in high-risk markets, such as the contemporary visual arts market, with extreme uncertainty about product quality caused by information deficiencies, the temporal order of the first sequence of signals originating exclusively from highly credible third party sources with different types of stakes received at the start of competitive activity matters, as it affects producers' long-term sales performance differently. Specifically, we found that the first sequence of signals from a source with a financial stake preceding one without has a greater positive effect on future sales than vice versa. Using fixed effects panel data regressions that controlled for time invariant factors, such as ability and perseverance, and time variant factors, such as the number of signals as well as the credibility and the type of stake the source transmitting the signal has in the future success of the producer, we find that the addition of the second signal originating from a highly credible third party source in a sequence is non-commutative. We argue that the constituent parts of source credibility are the key to understanding the differential effects on long-term performance.

We assume that customers are aware of producers' first sequence of signals, and build on previous studies by Rindova et al. (2010) and Bhargave and Montgomery (2013) by establishing that under conditions of uncertainty, a sequence of signals received at the start of competitive activity helps customers form impressions about producers' quality. In this case, the information provided by the sequence is more than merely the sum of the individual signals comprising the sequence. Literature on impression formation has already shown that information received first can modify the meaning of information received immediately afterward (Asch, 1946).

We argue that in addition to this, the credibility of the source transmitting the second signal may be lowered. This could be the case if there is the perception that the second source is taking less risk and reducing its exposure to penalty costs because it is simply following or imitating the quality evaluation provided by the first source.

In the sequence of signals in which a highly credible third party source without a financial stake in the future success of the producer precedes a signal from a highly credible third party source with a financial stake, we observe that the addition of the signal from the second source reduces the effect on long-term sales performance compared to the reverse sequence. In as far as this can be observed, customers perceive the second source with a financial stake in the producer to be taking less risk because it appears to simply imitate the quality evaluation of the first source. Additionally, the perception of the second source as having specialized knowledge may be decreased, because it appears to be reproducing information. At the same time, the second source is curtailing its exposure to penalty costs if the quality information transmitted is incorrect. For example, if the quality evaluation of the first source turns out to be incorrect, the second source can escape some of the penalty costs by placing the responsibility of incorrect signaling on the first source, and blaming that source for misleading actors in the market by transmitting false quality evaluations. If customers have the impression that a high credibility source is not fully taking the risk of incurring penalty costs associated with incorrect signaling, but rather acts opportunistically by, for example, jumping on the bandwagon, then the



effectiveness of the signal transmitted by the second source will be lower and the long-term impact of the sequence depreciated. In other words, adding the credibility of the two sources gives a lower effect on long-term sales performance. This is because in this particular sequence of signals the second source transmitting the second signal may be perceived as copying the first source. If this is the case then the second source will be subject to lower penalty costs than it would be in the reverse sequence. Hence, this sequence of signals is less effective on long-term sales performance.

However, if the sequence is reversed, namely the first signal originates from a high credibility third party source with a financial stake followed by a signal from a high credibility third party source without a financial stake, our results show that the effect on long-term sales performance is significantly higher. In as far as this is observable, we argue that customers are aware that this source cannot afford to make mistakes in quality evaluations because they directly risk losing their investments in the producer along with incurring penalty costs – reputation and/or financial – for transmitting an incorrect signal. This investment commitment signals to the market that this source believes in the new producer's potential quality but it also signals that this source cannot afford to transmit erroneous signals or signals about low quality producers because of the immanent loss of capital involved (Stuart et al., 1999). At the same time, the second source without a financial stake in the future success of the producer is perceived to provide independent quality information, and certainly not become emboldened by other high credibility sources issuing signals, because their very livelihood depends upon them providing accurate and autonomous quality evaluations (Lampel and Shamsie, 2000). In other words, the constituent parts of source credibility, particularly the risk of penalty costs, are reduced to a lesser extent than those of the second source in the reverse sequence. Our results provide evidence that the addition of source credibility in a sequence is non-commutative, and that the addition of these two high credibility sources makes this particular order of signals in a sequence have a greater effect on long-term sales performance than *visa versa*.

Our findings can be further explained by looking at the particular dynamics of our empirical setting, the contemporary visual art market, particularly the primary art market, which can be regarded as a small world network (Milgram, 1967; Uzzi and Spiro, 2005). The ties between visual artists, third party sources, and customers are often closely linked. This can positively affect artists' long-term economic outcome (Becker, 1974), as well as the livelihood of third party sources. But the small world network can also negatively affect the perception customers have about source credibility. This effect is visible in one of the focal sequences in our study, namely, a highly credible third party source without a financial stake followed by a signal from a highly credible third party source with a financial stake. The high credibility third party sources transmitting the second signal in this sequence is an art gallery, and customers may perceived this source as not taking the full risk of incurring penalty costs but rather simply imitating the quality evaluation of the first source, which in our empirical setting could be a review from a critic in a media outlet or a jury awarding a prize on behalf of an organization. Our results show that this particular sequence of signals has a lower effect on long-term sales performance than the reverse sequence. One possible explanation could be that there is the perception, warranted or not, that the art gallery is acting opportunistically and simply following the quality evaluations

of the critics or jury members. Customers may believe that the art gallery is not transmitting original signals based upon their knowledge of contemporary visual art but rather succeeding to other highly credible sources' quality judgments.

However, if the sequence of signals is reversed, the effect on long-term sales performance is higher. One possible explanation could be that exactly because of the extreme uncertainty about artworks sold on the primary art market, customers rely on quality evaluations conveyed by gallery owners because of their financial commitment, in conjunction with the risk they take of accruing penalty costs, which sends a strong signal to the market that they acknowledge producers' potential. The second source with a non-financial stake in the producer is expected to provide independent quality evaluations autonomously to what others are signaling in the market; the livelihood of these sources depends upon this. Another possible explanation could be that a usual sequence of signals in this market is an exhibition at an art gallery followed by a critical review in a newspaper. Perhaps this order of quality information is most informative to customers in their pre-purchase decision-making.

### 5.7.2 Limitations and future research

Our study has a few important limitations, which also give an indication for future research potential. First, we focused on the effects of the sequence of signals received at the start of a producer's competitive activity. Future research could focus on gaining a better understanding of consumer perceptions and decision making right after the first sequence of signals and future performance. Quality judgments are not necessarily indicative of quality but rather can simply come into existence because of prior signals producers received, which can for instance initiate self-reinforcing mechanisms (Merton, 1968), or informational cascades that can lead to hypes and bubbles (Bikchandani, Hirshleifer, and Welch 1992). Of particular interest could be to understand the role sequences of signals occupy in initiating self-reinforcing feedback loops and starting hypes.

Second, it is conceivable that a particular temporal ordering of signals in a sequence is less useful in other periods of producers' competitive activity because of different expectations from customers about quality. Future studies could therefore explore the effects of signals from different types of sources in different time frames of producers' career trajectories.

Third, we studied a particular market, and a particular group of artists that are alumni of a prestigious art institution. These artists are predominately active in the high end of the primary art market. Future studies could focus on other empirical settings. An example that comes to mind is highly innovative new ventures, such as high tech, and the – sequential – effect of signals received from sources with financial stakes such as angel investors or venture capitalists (Pollock, Chen, Jackson and Hambrick, 2010), and those from sources that do not have a financial stake such as journalists writing for trade journals and/or newspapers (Pollock and Rindova, 2003).

Finally, future research could look more closely at other dimensions of signals from third party sources. It would be especially useful to study, the salience of signals, which is their propensity to be noticed or to "stand out" in an environment (Guido, 1998). Since there is only so much information customers can think of at any given time, a better understanding of these characteristics can provide a better understanding of customer behavior.

## 5.8 APPENDIX

### APPENDIX A: Correlation Matrix

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.
1. LOG LATE SALES	1.0000												
2. NF-H_F-H	0.0965	1.0000											
3. NF-L_F-L	0.0425	-0.0251	1.0000										
4. F-H_NF-H	0.1150	-0.0142	-0.0272	1.0000									
5. F-L_NF-L	-0.0021	-0.0158	-0.0304	-0.0171	1.0000								
6. NF-H_F-L	0.0004	-0.0116	-0.0223	-0.0126	-0.0140	1.0000							
7. NF-L_F-H	0.0744	-0.0164	-0.0314	-0.0177	-0.0198	-0.0145	1.0000						
8. F-H_NF-L	0.0845	-0.0098	-0.0189	-0.0106	-0.0119	-0.0087	-0.0123	1.0000					
9. F-L_NH	0.0717	-0.0147	-0.0281	-0.0159	-0.0177	-0.0130	-0.0183	-0.0110	1.0000				
10. COUNT NF	0.1122	0.1395	0.2772	0.0745	0.0495	0.0761	0.2097	0.0675	0.0993	1.0000			
11. COUNT F	0.1404	0.1313	0.3284	0.2365	0.2908	0.1394	0.2245	0.1564	0.2748	0.3111	1.0000		
12. AVE CRED NF	0.1766	0.2064	0.1827	0.2420	0.1070	0.1851	0.1723	0.1537	0.2090	0.5723	0.3305	1.0000	
13. AVE CRED F	0.1873	0.3166	0.2408	0.3302	0.1501	0.1198	0.3789	0.1820	0.2164	0.2825	0.7318	0.3582	1.0000

Legend: r values greater than or equal to .04 are significant at  $p < .001$

Observations: N = 12717

Artists: N = 471

## CHAPTER 6

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### DISCUSSION AND CONCLUSION

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Producers who have been the subject of signals outperform those who have not. That is the simple conclusion. One reason for this is that signals act as proxies of quality and help reduce buyers and intermediaries' uncertainty by conveying observable information about producers' unobservable or latent quality. But not all signals are equally persuasive and hence, may have differential effects on producers' performance outcomes. Different kinds of signals originating from different kinds of sources with different levels of credibility are often the only proxies of quality available, particularly in markets with imperfectly detectable quality differentials among competitors and imperfect and incomplete information about the products made and sold. Furthermore, these signals may be transmitted in different phases of producers' competitive activity while different categories of buyers and intermediaries are observing them, either individually or as sets or interactions between signals or sequences of signals. A core question presented in this thesis was: Are there differential effects among producers' performance outcomes based upon different combinatorics of signals and sources transmitting those signals during different phases of competitive activity? The simple answer is yes. And that is where it gets complicated.

The primary market for contemporary visual art, the focal market of this thesis, is a well-suited empirical setting to study the relationship between the above mentioned combinations of signals and sources and artists' sales performance, reputational rankings, affiliations with core mediators, and selection to a prestigious program. A unique longitudinal dataset with signal and sales information about the career trajectories of 1,590 visual artists was compiled, and validated using within and between methodological triangulation and then made amenable to econometric analyses. Using non-parametric and semi-parametric models, i.e., switching regressions based on the Heckman two-stage model, Poisson regressions, Cox event history and competing risks analyses, the four studies that make up this thesis empirically demonstrated that signals matter. But temporal dimensions, quantitative signal characteristics and qualitative source attributes determine the extent to which they matter. This is because of the direct way different combinations may affect self-reinforcing feedback-loops that once started, provide some producers a competitive advantage over their rivals. Understanding these competitive dynamics provides additional insight into helping to explain the disproportionately skewed distribution of success in this market, and other markets where the quality of the products are often unknown to all parties in a particular transaction.

Signals received at the start of competitive activity strongly influence producers' career trajectories and performance outcomes. Again, that is the simple conclusion. But it becomes complicated because, as already mentioned above, not all sources transmit equally persuasive quality signals, and the disparity in magnitude may differentially influence producers' career trajectories. Especially in the nascent stage of competitive activity, buyers and intermediaries may gain extra confidence in producers' underlying quality based upon qualitative attributes of the source transmitting the signal, i.e., source credibility levels, diversity in kinds of sources and the financial or non-financial stake sources may have in transmitting signals about producers. This is important because if buyers or intermediaries' confidence leads to a small or seemingly inconsequential difference in quality perceptions about a focal producer, it may help trigger preferential treatment and grant opportunities to this producer that are not afforded to others. If

this leads to superior performance, than self-reinforcing feedback mechanisms may be created and maintained, further increasing the performance differentials between this producer and other competitors (Merton, 1968; Azoulay et al., 2013).

Theme 1 addressed this issue by focusing on the effects of multi-dimensional qualitative attributes of sources conveying signals, and Theme 4 concentrated on different phases of producers' career trajectories. Both of these themes are common threads that run across all four studies. Specifically, Chapter 2 focused on the extent to which scores applicants received from jury members on selection criteria during the last round of a multi-round selection process predicted short and long-term performance outcomes of those accepted and rejected. Those applicants who transmitted credible signals had a greater likelihood of acceptance to the program. This chapter focused on how the jury reacted to the available signals and judged the credibility of the applicants; by studying the career performances of both accepted and rejected candidates, a greater understanding of the extent to which these same signals predict differentials in overall career outcomes was gained.

These recurrent themes: qualitative source attributes and career phases were also highlighted in Chapters 4 and 5. These two chapters focused specifically on the nascent phase of competitive activity and empirically demonstrated that the order of the *first* sequence of signals from highly credible third party sources with different stakes in the future performance of the subject of the signals (Chapter 5) and the diversity of sources transmitting signals about the focal producer (Chapter 4) positively and significantly affected producers' long-term performance outcomes. Collectively, Chapters 2, 4 and 5 provided empirical evidence showing that at the start of producers' careers, qualitative attributes of sources transmitting signals, i.e., level of credibility, diversity in kinds of sources and their stakes, created performance differentials among producers that generally continued over the entire productive lifetime.

Complementing these aforementioned studies, Chapter 3, concentrated on all phases of producers' competitive activity. This chapter empirically demonstrated that the number of signals, including past sales, in a given year positively increased the likelihood of producers' products to be purchased in the following year, but per kind of signal the increase in the quantity of sales and sales price were different. This difference was directly related to qualitative source attributes; namely, the source credibility level, which was found to systematically influence self-reinforcing mechanisms governing competitive dynamics across all career phases.

In short, the more a market is characterized by uncertainty about the quality of products and producers, the more powerful some sources transmitting quality signals will be. Paradoxically, however, too many signals from too many sources may result in information overload, which adds to uncertainty, further complicating decision-making processes. Under conditions of bounded rationality, intermediaries and buyers –even those with high-levels of specialized knowledge and access to detailed information from their professional networks – may rely on simple rules or heuristics to help them overcome information overload caused by heterogeneous signals transmitted by heterogeneous sources about producers. Bounded rationality (Simon, 1972) suggests that buyers and intermediaries are bound by their cognitive limits because they cannot access and assimilate all quality information about all producers in

a focal market, and instead of seeking to maximize their benefit by searching comprehensively for information they rely on simple rules to guide them in their decision making.

One way to reduce uncertainty in conditions of bounded rationality is through commensuration, which enables the transformation of heterogeneous information about producers' quality into a common metric (Espeland and Stevens, 1998). Theme 2 addressed this issue by focusing on how the number of signals of the same kind or highly diverse sets of signals from different kinds of sources function as an aggregate indicator of quality by combining quantitative and qualitative information about a focal producer's quality and transforming it to a common standard useful in making comparisons among competitors. Under conditions of bounded rationality, the extent to which signals of the same kind or sets of signals of different kinds affect different kinds of buyers and different kinds of intermediaries, presented in Theme 3, is important because it provides insights into understanding success in markets with incomplete and imperfect information about the producer's underlying yet hard to directly observe quality. Again, these two themes weave through the four studies in this thesis, as discussed below.

Largely due to high costs of searching and assimilating all available quality information about all producers in a focal market, buyers and intermediaries may consciously or unconsciously rely on heuristics to simplify their decision-making. Chapter 2 empirically demonstrated that juries rely on aggregate information provided by applicants when making their admission decisions. Chapter 3 showed the degree to which self-reinforcing processes governing competitive dynamics in a market are also determined by past sales; the data provided empirical evidence showing that expert buyers often based their decisions on the purchase decisions of others in their professional network. In general, aggregating heterogeneous quality information into a whole was a heuristic used by decision-makers in both chapters; and specifically in Chapter 3, buyers engaged in observational learning (Bandura, 1977; Bikhchandani, Hirshleifer, Welch, 1998) and relied on other buyers' purchases as signals of quality, which affected their purchase decisions (Salganik, Dodds and Watts, 2006; Salganik and Watts, 2009).

Chapter 4 and Chapter 5 concentrated on sets of signals functioning as wholes by emphasizing diversity of sources and the variance of the credibility of those sources as well as the temporal order of signals in a sequence of signals, respectively. Chapter 4 focused on core mediators, a specific kind of intermediary, whose explicit decision to signal about new producers allows them to cross the so-called legitimacy threshold (Zimmerman and Zeitz, 2002; Rutherford and Buller, 2007; Rutherford, Buller, and Stebbens, 2009) and compete in a market as fully-fledged and legitimate competitors. The results from the empirical analysis showed that greater diversity in kinds of sources provided core mediators additional confidence in their perception of the underlying quality of the nascent competitors. Put differently, greater source diversity helps core mediators discount possible biases about producers from third party sources of the same kind, and at the same time gain additional confidence in the underlying quality of the focal producers. Chapter 5 showed that the temporal order of the first sequence of signals in a producer's career transmitted by highly credible third party sources with different stakes in the future performance of that producer had differential effects on performance outcomes. Specifically, the long-term effect was significantly stronger when the first signal

in the sequence originated from a third party source with a financial stake followed by a signal from a third party source without a financial stake, compared to the reverse. This demonstrated that the order in which signals occur in a sequence is often used as a heuristic during pre-purchase decision-making, and that the addition of the effects of sources with different stakes is not commutative. If sequence matters here, in the rather extreme case of a first sequence of quality signals affecting overall career performance, it is to be expected that sequences will also matter in different career phases.

In conclusion: signals matter because they help overcome uncertainty about producers' quality in markets with information gaps, and the sources transmitting those signals determine the extent to which they matter. That is simple. But it becomes complicated when discerning which ones, because different quantities or sets of signals transmitted by different kinds of sources with different qualitative attributes conveyed at different phases of competitive activity have differential effects on producers' short and long-term performance outcomes. And too many different kinds of signals transmitted by different kinds of sources may result in further complications caused by information overload. In these situations, consciously or unconsciously buyers and intermediaries will be likely to opt for simpler rules, precisely because the demands of the more sophisticated ones seem too high. Following the basic approach of bounded rationality, relying on a simple rule for which one has adequate information can be more attractive than relying on a better but much more complicated rule for which one might not have all the right information within a reasonable time. Transforming quantitative characteristics of signals and qualitative attributes of sources transmitting those signals into a common metric is advantageous because it reduces costs and enables quick comparison among competing producers, but aggregating quantitative and qualitative information into a whole is a complex process. And that is where it becomes difficult again. And because of that difficulty, buyers and intermediaries will be attracted to using shortcuts to interpret impressions of complex wholes and triggers that provide additional confidence of their initial intuition regarding focal producers. In turn, this means that particular combinations of signals, particular sequences, particular levels of diversity along particular dimensions can act as such triggers and thereby the signals that comprise these combinations or sequences, or lead to these levels of diversity, will be more powerful than the sum of their individual effects. So to understand how and why the simple rule works, one needs to give attention to the complicated arrangements that can power the simple rule.

But at the same time it is simple. In the nascent phase of competition, producers who are the subject of signals will outperform rivals with - and without - signals as long as the signals they are the subjects of are transmitted by highly credible or diverse kinds of sources and received in the right order. In later phases of competition, past signals - the strength of which is moderated by source credibility - and past sales provide producers a competitive advantage that systematically translated into superior and persistent performance. Although producers simply need to become the subject of the right signals from the right sources at the right time, the simplicity of this recipe for success greatly increases competitive pressure, especially in a market context characterized by oversupply. One rarely gets a second chance to make a good impression. Each period brings a new cohort of competitors to the market who compete

to become the subject of the most credible signals and the most effective combinations of signals. High-prestige art academies as well as core mediators feel pressure to select the right artists at the right time, while their decisions can affect the chances that the artist will receive attention from buyers and other decision makers. And they, the core mediators possibly more in respect to commercial success and the art academies possibly more in respect to reputational success, will try to predict the artist's future career performance, and will have a vested interest in their predictions coming true, just as the other third party sources, especially the highly credible ones. Referring back to the cartoon presented in the introduction of this thesis, where a middle-aged couple is looking at a contemporary artwork; a response from the husband to his wife's perplexity concerning the contemporary artwork could have been: *"It really is simply complicated, darling. But of course that is old news now"*.

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## **OBSERVABLE PERSUADERS:**

### **A Longitudinal Study on the Effects of Quality Signals in the Contemporary Visual Art Market**

#### **SUMMARY**

Information about the quality of producers or products has strategic value and affects economic decisions. But what happens in markets where there is extreme uncertainty because quality is difficult to observe directly and objective criteria to make quality judgments are lacking? Indiscernible or indeterminate or even latent quality means to a large extent that producers' underlying quality often remains unknown to all parties involved in a transaction. In markets where information about quality is incomplete and imperfect, signals -functioning as proxies of hard-to-observe quality - are useful in helping to reduce uncertainty. At the same time, signals also shape quality perceptions buyers and intermediaries have about producers who are the subject of the signals. And this may create a competitive advantage for some producers, which may translate into long-term differential effects on their performance outcomes compared to other competitors.

The core focus of this thesis is on gaining a fine-grained understanding of the effects of signals on producers' performance outcomes, and specifically on persistence in performance created by self-reinforcing feedback loops initiated by initial advantages from early career signals and/or from signals in later stages of competitive activity. Emphasis is placed on analyzing the differential effects different kinds of signals transmitted by different kinds of sources with different qualitative attributes at different phases in producers career trajectories have on buyers and intermediaries, and how simple or more complicated combinatorics affect producers' performance outcomes at different stages of their competitive activity. To gain a deeper understanding of persistence in performance differentials, special attention is given to exploring the extent to which past performance described by different sets of signals and diverse sets of sources and interactions between quantitative signal characteristics and qualitative source attributes and sequences of signals, especially the temporal order of signals in the sequence, influence different kinds of buyers and different kinds of intermediaries' purchase decisions.

In short, signals – reviews, awards, exhibitions, subsidies, art gallery affiliations – transmitted by sources – first and third parties - and buyers -museums, corporate collectors and private collectors – as well as intermediaries – selection committees to a prestigious art program and core mediators who grant selected producers full-fledged legitimacy - are distinguished and used to predict producers' success, both reputational and financial. Additionally observational learning and herd behavior among buyers is studied. Often when there is uncertainty in the market due to imperfect and incomplete information, observation of others – their actions, payoffs and/or consequences of their actions – becomes the dominant signal. This thesis examines the extent to which “doing what everyone else is doing” may override quality information provided by other signals.

The empirical results of the four core studies all point to the fact that in markets characterized by uncertainty about the quality of producers and/or products - signals matter. But the extent to which different kinds of signals in a multi-signal environment matter is dependent on complex processes rooted in transforming varied information into an aggregate indicator of quality. Under conditions of bounded rationality, intermediaries and buyers –even those with high-levels of specialized knowledge – often rely on simple rules to help them overcome information overload caused by heterogeneous signals transmitted by heterogeneous sources about producers' quality. This thesis provides a detailed empirical analysis of these complex processes and an in-depth understanding of how simple and complicated arrangements of signals and sources transmitting those signals affect producers' short and long-term performance outcomes during different career stages.

## WAARNEEMBARE VERLEIDERS

### **Een longitudinale studie naar de effecten van kwaliteitssignalen in de hedendaagse beeldende kunstmarkt**

#### **SAMENVATTING**

Informatie over de kwaliteit van producenten en producten heeft strategische waarde en beïnvloedt economische beslissingen. Maar wat gebeurt er in markten waar extreme onzekerheid bestaat, omdat kwaliteit moeilijk direct waarneembaar is en objectieve criteria ontbreken om kwaliteit te beoordelen? Kwaliteit die niet te onderscheiden, onbepaald, of zelfs latent is, leidt er in belangrijke mate toe dat de onderliggende kwaliteiten van producenten onbekend blijven voor alle deelnemers aan een transactie. In markten waar kwaliteitsinformatie incompleet en imperfect is, zijn signalen, die kunnen dienen als benadering van moeilijk waar te nemen kwaliteit, nuttig om onzekerheden te reduceren. Dit kan een concurrentieel voordeel geven aan sommige producenten, hetgeen zich kan vertalen in positieve gedifferentieerde lange termijn-effecten in vergelijking met andere mededingers.

De kern van dit proefschrift richt zich op het verkrijgen van een gedetailleerd begrip van het positieve effect van signalen op de uitkomsten voor producenten en meer in het bijzonder op de persistentie in de prestaties die veroorzaakt worden door zelfversterkende terugkoppelingen. Deze zijn weer het gevolg van initiële voordelen veroorzaakt door signalen aan het begin van een carrière of signalen die wijzen op concurrentiële activiteiten in latere stadia. De nadruk wordt gelegd op het analyseren van de differentiërende effecten, van verschillende soorten signalen, die worden afgegeven door verschillende bronnen met verschillende kwalitatieve eigenschappen in verschillende stadia van de carrières van producenten. Het gaat om signalen die worden afgegeven aan kopers en tussenpartijen, en om hoe eenvoudige of complexe combinatorische uitkomsten de prestaties beïnvloeden van producenten in verschillende stadia van hun concurrerende activiteiten. Om een dieper inzicht te krijgen in de persistentie in de verschillen in de prestaties, wordt bijzondere aandacht besteed aan het verkennen van de mate waarin behaalde resultaten uit het verleden, zoals beschreven door verschillende combinaties van signalen en bronnen, interacties tussen kwantitatieve signaalkenmerken en kwalitatieve eigenschappen van bronnen, en reeksen van signalen, in het bijzonder de volgorde in de tijd van signalen, invloed hebben op de aankoopbeslissingen van verschillende kopers en verschillende intermediairs.

In het kort, de signalen - recensies, prijzen, tentoonstellingen, subsidies, affiliaties met kunstgalerijen - overgedragen door bronnen en kopers - musea, bedrijfsverzamelaars en privéverzamelaars, tussenpersonen, selectiecommissies voor prestigieuze kunstprogramma's en belangrijke bemiddelaars, die de geselecteerde producenten volwaardige legitimiteit verlenen - worden onderscheiden en gebruikt om het succes van de producenten te voorspellen, zowel qua reputatie als financieel. Daarnaast wordt observerend leren en kuddegedrag onder kopers bestudeerd. Vaak, wanneer er onzekerheid in de markt is als gevolg van gebrekkige en onvolledige informatie, wordt het observeren van anderen, hun acties, de opbrengsten en/of de gevolgen van hun acties, het dominante signaal.

Dit proefschrift onderzoekt de mate waarin "doen wat iedereen doet" informatie van goede kwaliteit, die door andere signalen wordt afgegeven, kan overvleugelen.

De empirische resultaten van de vier belangrijkste studies wijzen allemaal op het feit, dat in markten gekenmerkt door onzekerheid over de kwaliteit van de producenten en/of producten, signalen er toe doen. Maar de mate waarin verschillende soorten signalen in een multi-signaalomgeving er toe doen, is afhankelijk van complexe processen die geworteld zijn in het transformeren van verschillende informatie in een geaggregeerde indicator van kwaliteit. In de context van beperkte rationaliteit vertrouwen tussenpersonen en kopers - ook die met een hoge mate van specialistische kennis, - vaak op eenvoudige vuistregels om de overbelasting met informatie, die wordt veroorzaakt door heterogene signalen van heterogene bronnen over de kwaliteit van de producenten, te overwinnen. Dit proefschrift geeft een gedetailleerde empirische analyse van deze complexe processen en een diepgaand inzicht in hoe eenvoudige en ingewikkelde samenstellingen van signalen en bronnen die deze signalen verzenden, van invloed zijn op de korte en de lange termijn uitkomsten van de producenten tijdens de verschillende stadia van hun loopbanen.

## ACKNOWLEDGMENTS

The very first time I thought about pursuing a PhD was in 2009. I still remember the day vividly: it was sunny and I was talking to Nachoem Wijnberg, my master thesis supervisor at the time, in his office on the second floor of the M-building about the empirical results of my study. About five minutes into our discussion he asked me if I had considered getting a PhD, and before I had a chance to answer he started talking about a grant from NWO, the so-called Mosaic grant, for students who were interested in pursuing a PhD in the Netherlands and were not Dutch. He went into details about who qualifies, explaining to me that either you or one of your parents must have been born in a country that was on this special NWO list. Immediately following, he told me that countries like the United States or Germany would definitely not be on the list, but countries like China, Ecuador and the Slovak Republic, were I was born, probably were. He then downloaded a pdf from the NWO website and said that the application deadline was approaching very quickly and if I was interested in applying I had no time to waste. I left his office that day with lots of questions – e.g., I had no idea what NWO was, let alone what pursuing a PhD entails, and for that matter what academics actually did the whole day – so I went home and started my Google search.

In 2011, my second attempt in being awarded the Mosaic grant was successful; that year there were a little more than 250 applicants across all academic disciplines, of which 19 laureates were selected. In January 2012, I started working as a PhD candidate at the University of Amsterdam; naturally, Nachoem was my supervisor. I was also fortunate to have Joris Ebbers as my co-supervisor. I am grateful to you, Nachoem for making the suggestion I apply for the Mosaic grant and helping me get it, and thank you to both of you for your guidance and friendship during the last four and a half years. Nachoem, your out-of-the-box approach to academia and your creativity in doing research coupled with the slightly more procedural approach Joris maintains provided a nice balance that helped me grow academically and become a better researcher.

I would also like to thank my distinguished dissertation committee members for reading my thesis: Candace Jones (University of Edinburgh), Roy Suddaby (Gustavson Business School, University of Victoria), Joop Hartog (University of Amsterdam), Marc Salomon (University of Amsterdam) and Arno Witte (University of Amsterdam).

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The past four and a half years I spent a lot of time at the faculty, especially in my office behind my laptop. Fortunately, I was able to share my office with some awesome office mates: Anour, Joris D., Daniel, Bram, Robert, Liang and Zhe. Mostly working silently but very often engaging in interesting academic (and non-academic) discussions, I probably spent more time with you than with my family. I was also quickly introduced to academic conferences, which – if you are lucky – are held in exciting places like Florence, Helsinki, Montreal, Monterey, Baltimore, Philadelphia, Istanbul, Vancouver, Valladolid, and Anaheim (ok, not exciting but fortunately very close to LA). In addition to attending paper sessions and PDWs at these conferences, I developed a taste for craft beers that I share with Joris, Bram, Stefan, and a penchant for tapas with Joop. I am fortunate to have wonderful colleagues who provide academic support as well as a fun social structure when traveling internationally. I am also very lucky to have amazing friends: Anette, Gees, Marc, Katja, Lykle, Heleen, Jan and Frank (to name a few) who managed not to fall asleep while I incessantly talked about my research.

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## **ABOUT THE AUTHOR**

Monika Kackovic is currently working as a postdoctoral researcher/assistant professor in the Entrepreneurship and Innovation department at the University of Amsterdam, Faculty of Economics and Business. She graduated cum laude with a Master in Science in Business Administration from the University of Amsterdam. Additionally, she holds a Bachelor of Science in Business Administration from Florida State University and a Bachelor of Arts from the Gerrit Rietveld Academy in Amsterdam, the Netherlands.

In 2012, she was awarded a four-year merit-based scholarship for her PhD research focusing on the effects of quality signals on competitive dynamics in the contemporary visual arts. In spring 2014, she was a visiting scholar at Harvard Business School, hosted by Professor M. Khairi. In fall 2016, she began working as a postdoctoral researcher on a project focusing on corporations that collect art. She actively presents her academic work at international conferences such as: *Marketing Science*, *Academy of Management*, and *European Group for Organizational Studies*.

Monika has regularly been invited to speak at public events, such as a symposium in 2015 at the Rijksmuseum that was organized by the Netherlands Association of Corporate Art Collections (VBCN), a debate organized by Foam Photography Museum at the Dutch Embassy in Paris, France, and symposia organized by the Dutch Ministry of Education, Culture and Science (OCW), Castrum Peregrini and Spui 25.

Prior to her academic career, Monika worked in consulting at Arthur Andersen LLP and Koninklijk Grolsch, a FMCG company, as sales and marketing manager Caribbean and duty free United States. In addition to her academic and industry experience, she maintains a visual art practice. Her work was included in the Top 10 Best Art Videos at the World One Minutes connected with the cultural program for the Olympic Games, Beijing (CN) and purchased by the Netherlands Public Radio (NPO).

### **Academic Grants and Awards**

2012 – 2016 Mosaic Grant of € 200,000 awarded by the Netherlands Organization for Scientific Research (NWO) to M. Kackovic (main applicant) for her PhD research.

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Information about the quality of producers or products has strategic value and affects economic decisions. But what happens in markets with informational gaps because quality is difficult to observe directly and objective criteria to make quality judgments are lacking? Quality that is indiscernible or indeterminate or latent means to a large extent that it remains unknown to all parties involved in the transaction or even thereafter. Signals –e.g., reviews, awards, prestigious affiliations, past sales – may act as observable persuaders and reduce uncertainty caused by informational imperfections. At the same time, signals may shape future perceptions buyers and intermediaries have about those producers, and this may lead to a competitive advantage for a select few. Effectively, even seemingly inconsequential rewards or benefits gained by being the subject of a signal may grant some producers access to opportunities not given to others. Such preferential treatment could lead to superior performance that could start self-reinforcing feedback mechanisms, which could result in persistent performance for some producers compared to the rest.

In the empirical setting of the primary market for contemporary visual art, the career trajectories of 1,590 visual artists from two prestigious art institutions in the Netherlands are studied. A multi-dimensional approach is taken in analyzing quantitative characteristics of signals and qualitative attributes of sources conveying those signals, and examining these effects on not only different categories of buyers and intermediaries but also in the context of the particular career phase of the producers. The empirical results show strong self-reinforcing processes governing competitive dynamics, offering a fine-grained understanding of a source of inequality in the distribution of success in this market where quality differentials among competing producers are imperfectly observable, information about their underlying quality is imperfect and/or incomplete and objective measures for evaluation are lacking.

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