



Original Article

How portraits turned their eyes upon us: Visual preferences and demographic change in cultural evolution

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ABSTRACT

It has often been suggested that innate features of the human mind could make some cultural forms more successful than others. This paper presents a case study consistent with this “cognitive attraction” hypothesis. Numerous studies show that direct eye-gaze catches the attention of adults and newborns. Adults find it more attractive. We explore one possible cultural consequence of this cognitive appeal. Among XVth century European portraits, direct-gaze paintings are more likely to be featured in today’s art books. In Renaissance Europe, the proportion of paintings that stare at the viewer grows gradually, strongly, and remains prevalent for centuries. A demographic analysis of this shift shows that it was due to the arrival of new generations of painters. Those artists show a preference for direct-gaze portraits as soon as they start painting, suggesting that they acquired the new style in the years of their apprenticeship. The preferences of those painters and of contemporary art critics seem consistent with the innate attentional bias that favours direct-gaze faces. The structure of the “Renaissance gaze shift” bears evidence for the importance of demographic turn-over in cultural change.

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1. Introduction

You probably have in your wallet, or on your hard disk, a representation of a human face that seems to be looking out of the picture into your eyes. This visual illusion is so common we hardly notice it. Yet its effects on our mind are far from trivial (Wollaston, 1824). As compared to a slightly averted gaze, direct eye-gaze in pictures facilitates identification and gender assignment (Macrae, Hood, Milne, Rowe, & Mason, 2002; Vuilleumier, George, Lister, Armony, & Driver, 2005). Direct eye-gaze is attention-grabbing as well. Staring faces make more potent distractors than averted-gaze faces (Conty, Gimmig, Belletier, George, & Huguët, 2010; Senju & Hasegawa, 2005). Direct-gaze faces are more arousing, as evidenced by physiological measures such as galvanic skin response (Nichols & Champness, 1971). Direct-gaze pictures of faces (even neutral faces) are rated by subjects as more “likable” or “attractive” (Conway, Jones, DeBruine, & Little, 2008; Ewing, Rhodes, & Pellicano, 2010) – but see Hietanen, Leppänen, Peltola, Linna-Aho, and Ruuhiala, (2008). Some of these effects of direct eye-gaze are probably due to innate features of our visual system. Children as young as three days old preferentially look at direct-gaze pictures of still faces (Farroni, Csibra, Simion, & Johnson, 2002). Direct eye-gaze facilitates identification in 4 months-old as it does in adults (Farroni, Massaccesi, Menon, & Johnson, 2007).

Several authors have suggested that open eyes facing the viewer were ubiquitous in various artistic traditions, given their psychological impact (Cross, 2003; Eibl-Eibesfeldt, 1988). Yet for all their cognitive appeal, direct-gaze depictions of the human face are not a universal standard, far from it. Identity documents are overwhelmingly direct-gazing (indeed that is often a legal requirement). So were Greek and Egyptian funerary portraits. Yet, in many other traditions (Indian and Japanese portraits, for instance) direct eye-gaze is hardly ever present. Most portrait traditions are constrained by rigorous (and possibly arbitrary) norms concerning the sitter’s pose. In many cases, these artistic standards can mesh with local norms governing gaze behaviour. Many cultures implicitly forbid staring in some contexts. Those norms may have an incidence on portraits, especially when they are painted for ritual purposes. Korean official portraits, for instance, came from a court society where etiquette frowned upon gazing. Asked to check that the King’s portrait was faithful, some officials remarked that they could not know: they had often been in the King’s presence, but never looked at his face (Söng-mi, 2008 p. 120). Thus, there is no denying that gaze direction in portrait traditions varies a lot. This paper contends, however, that in traditions where gaze direction is left free to vary, so that we find both averted and direct-gaze portraits, the latter style should enjoy more success and, over time, become the default option.

A growing body of work shows that a “cognitive attraction” drives many cases of cultural evolution (Sperber & Hirschfeld, 2004). Widespread cognitive biases appear to constrain the evolution of cultural forms, from folk tales (Norenzayan, Atran, Faulkner, &

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Schaller, 2006) and urban legends (Heath, Bell, & Sternberg, 2001) to table manners (Nichols, 2002) and religious beliefs (Boyer & Ramble, 2001). Concerning portraits, Costa and Corazza (2006) show that painters exaggerate “neotenic” features in their portraits: traits like big eyes or round faces, which make faces seem more attractive to viewers across many cultures and from the youngest age.

If cognitive attraction played a role in the evolution of paintings, it should contribute more to the fame of direct-gaze portraits. It should favour, over time, a gradual replacement of averted-gaze portraits with direct-gaze portraits. We should also be able to identify the drivers of this evolution, and identify the kind of mechanism that explains the change (e.g., individual learning or demographic change). Each one of these questions asks how cultural evolution and cognitive attraction, two phenomena that are often studied separately, may influence one another. To answer these questions, we used a quantitative analysis of Renaissance portraits (Mcmanus & Humphrey, 1973; Tyler, 1998). Three studies looked at the effect of cognitive attraction on the evolution of direct eye-gaze from different angles. Study 1 shows that direct-gaze portraits are cognitively attractive with today's critics: they are more likely to be featured in art books. Study 2 shows a sustained shift in the Renaissance portrait traditions, favouring direct-gaze portraits. Study 3 shows that the shift was due to the arrival of new generations of painters, not to a change in the way sitters posed, to a change in the style of individual painters, or to a preservation bias.

2. Study 1: Did direct-gaze portraits become more famous than others?

European portraiture was chosen because (unlike most portrait traditions) it produced both averted-gaze and direct-gaze portraits. (A similar tradition, Korean portraiture, was studied as well with similar results. See Electronic Supplementary Materials, 1, available on the journal's Web site at www.ehbonline.org, and our conclusion). Our investigation focuses on the XVIth century (a period that is as well studied as the XVth century and was much more productive). European portraiture is a fairly recent tradition by global standards. Single-piece (“autonomous”) portraits were rare before the XVth century. Yet those earliest autonomous portraits also show a near absence of direct eye-gaze. It seems that we are dealing with a tradition where direct-gaze portraits were, at first, unknown or excluded by the artistic standards of the time.

2.1. Material selection and coding

The portraits included in this study were single original paintings where the painter tried to depict one other human individual's real appearance. This definition and the exclusion criteria it implies are detailed in the Electronic Supplementary Materials, 2 (available on the journal's Web site at www.ehbonline.org). Two big Internet databases were searched for European portraits: the JOCONDE database, which gathers paintings from most French public museums, and the WEB GALLERY OF ART database, which gathers paintings from the inventories of the most important museums in the world. 671 paintings were found.

Information was collected on the sitter's sex and notoriety. Sitters were classified between Identified sitters, who were either named or identified in some other way (e.g. “The artist's mother”), and Unidentified sitters. Identified sitters were classified into Famous and non-Famous. Sitters possessing an entry in one of five versions of Wikipedia (Italian, German, French, Dutch, Spanish, English) were Famous. Sitters who had an entry devoted to their portrait, not to their person, were not coded as Famous. (Only one sitter, Mona Lisa, could be said to have gotten into Wikipedia *only* because of her portrait). For

each portrait, the national “school” of the artist (“Italy”, “France”, “Germany”, “Netherlands”, “Spain”) was recorded.

All portraits were double-coded for gaze direction. As a first step, the author and a second coder coded all the paintings independently (Cohen's Kappa = 0.896, S.E. = 0.018). Most disagreements were solved by discussion. Persistent disagreement caused the discarding of 15 paintings (leaving 656 paintings).

Inclusion in an illustrated art book was used as an indication of a portrait's current fame. Such books typically present themselves as providing a selection of the best and most famous paintings from a given period. Most authors provide a reproduction of at least some of the most famous paintings of a given age (for instance, the *Mona Lisa*, Raphael's *Balthazar Castiglione* and Bellini's *Leonardo Loredano* were all reproduced in the majority of books). Are direct-gaze portraits in our two corpora more likely to be reproduced in art books because of this?

2.2. Selection of art books

Since mainstream, commercial books were needed, Web sites amazon.fr and amazon.com were searched exhaustively for books featuring a selection of portraits from our two traditions (see Electronic Supplementary Materials, 3, available on the journal's Web site at www.ehbonline.org, for the full lists of inclusion criteria and books). 11 books were found that fit our criteria. Many can be described as “coffee-table books”, i.e. they were sold for their aesthetic value at least as much as for their scientific value. The books came from five different countries. No book provided more than 25% of the reproductions, and most books provided more than 8%. As expected, there was a good deal of overlap between the books: 48% of reproduced paintings were reproduced in more than one book.

2.3. Analysis and results

A logistic regression was run using a portrait's presence in one of the art books as the dependent variable. Independent variables were the painting's date (measured in decades), the sitter's status, the sitter's gaze, the painter's school and the sitter's sex.

Table 1 displays the results. The art books selection of portraits is oriented in non-random ways. The prototype of the famous portrait is, so to speak, a *Mona Lisa*: a well-identified Italian woman (typically a daughter of a powerful family or the wife of some important bourgeois), painted in the first decades of the XVIth century. Like

Table 1
Logistic regression modelling the inclusion in art books of 656 European Renaissance paintings.

	B	S.E.	Wald	d.f.	Sig.	Exp(B)
Gaze (direct)	.650	.239	7.387	1	.007	1.916
Date (in decades)	-.239	.051	21.774	1	.000	0.788
Notoriety			33.368	2	.000	
Identified	1.290	.247	27.304	1	.000	3.631
Famous	1.687	.389	18.788	1	.000	5.403
Area (reference: Italy)			7.321	5	.008	
Germany	-.728	.304	5.720	1	.017	.483
France	-1.663	.511	10.579	1	.001	.190
Netherlands	-.673	.340	3.932	1	.047	.510
Spain	-.202	.698	.083	1	.773	.817
England	-.653	1.202	.295	1	.587	.520
Sex (woman = 1)	0.738	.237	9.718	1	.002	2.092
Constant	-0.744	.376	.921	1	.337	0.697
	χ^2	d.f.	sig.			
Omnibus model test	78.015	10	.000	Nagelkerke's R ²	18,2%	
Hosmer–Lemeshow test not significant (p=0.574)				percentage correct	82,50%	

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