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# Aesthetic Appreciation and Spanish Art: Insights from Eye-Tracking

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## Introduction

How do people look at and experience art? Which elements of specific artworks do they focus on? Do museum labels have an impact on how people look at artworks? The viewing experience of art is a complex one, involving issues of perception, attention, memory, decision-making, affect, and emotion. Thus, the time it takes and the ways of visually exploring an artwork can inform about its relevance, interestingness, and even its aesthetic appeal. This paper describes a collaborative pilot project focusing on a unique collection of 17th Century Zurbarán paintings. The Jacob cycle at Auckland Castle is the only UK example of a continental collection preserved in situ in purpose-built surroundings. While studies of the psychology of art have focused on individual works and distinctions between representative/non-representative topics, no work has been completed on the aesthetic appreciation of collections or of devotional themes. In this paper, we report upon the novel insights eye-tracking techniques have provided into the unconscious processes of viewing the unique collection of Zurbarán artworks. The purpose of this pilot study was to assess the effects of different written interpretation on the visual exploration of artworks. We will discuss the potential implications of

these techniques and our understanding of visual behaviours on museum and gallery practice. The project brings together established research strengths in Spanish art history, experimental psychology, digital humanities, and museum studies to explore, using eye-tracking techniques, aesthetic reactions to digital representations of the individual Zurbarán artworks as well as the significance of the collection as a whole.

## Overview

Our experience of art develops from the interaction of several cognitive and affective processes; the beginning of which is a visual scan of the artwork. When regarding an artwork, a viewer gathers information through a series fixations, interspersed by rapid movements of the eye called saccades. The direction of saccades is determined by an interaction between the goals of the observer and the physical properties of the different elements of the scene (e.g. colour, texture, brightness etc). Importantly, studying eye movements offers an insight that does not depend on the participants' beliefs, memories or subjective impressions of the artwork. Previous eye tracking research has highlighted the potential to transform the ways we understand visual processing in the arts (see for example Brieber 2014; Binderman et al., 2005) and at the same time offers a direct way of studying several important factors of a museum visit (Filippini Fantoni et al., 2013; Heidenreich & Turano 2011; Milekic 2010).

Zurbarán's cycle of Jacob and his Sons has been on display in the Long Room at Auckland Castle for over 250 years. It is the only cycle to be preserved in purpose-built surroundings in the UK, and one of very few of its kind in the world. It has a long history in scholarship (Baron & Beresford 2014), but many key aspects of its production and significance have not yet been fully understood. In this study we used eye-tracking in the first stage of exploring audience experience of the extensive Spanish art collections of County Durham, of which the 13 Zurbarán artworks (there are actually only 12 Zurbarán artworks, the 13th Benjamin, is a copy by Arthur Pond) are a key part of, to investigate the ways in which audiences look at Spanish art, how aesthetic experience is evaluated and whether audiences can be encouraged to approach art in different ways. This pilot project primarily investigated how participants visually explore artworks and provides new insights into the potential eye-tracking has to transform the ways we understand visual processing in arts and culture and

at the same time offer a direct way of studying several important factors of a museum visit, namely to assess the effects of label characteristics on visitor visual behaviour.

## Method

The aim of this study was to determine whether the accompanying written context influences how digital artworks are visually experienced. Whether contextual information impacts on where participants first look (first fixation), if gallery labels influence the time participants choose to view artworks and, especially, whether it influences their aesthetic appreciation of the works. We expected viewing time for artworks and corresponding labels to be predicted by participants' subjective experiences, artwork related features, and contextual factors. Accordingly, we measured viewing time, fixation, and saccades for each artwork and corresponding label using a fixed eye tracking technology ([Tobii TX300](#)) in a laboratory setting.

Forty Six students from the University of Durham participated in this study. All participants had normal or corrected vision, no formal training in arts or art history and received course credit for taking part. All participants gave informed consent. The study was approved by Durham University's Department of Psychology Ethics committee. A third of the participants were randomly assigned to the Museum Context group (nMC =16), who inspected digital images of the paintings in conjunction with the contextualizing labels currently in use at Auckland Castle, which rely heavily on relating the content of individual compositions to the words of Jacob in Genesis 49; a third to the Aesthetic Context group (nAC = 15), who received labels foregrounding issues of aesthetic and interpretive interest; and the final third to the No Context group (nNC = 15), who received only basic attribution data: title of composition, name and date of artist, date of composition, and nature of medium (i.e. "oil on canvas").

All stimuli were taken from Auckland Castle's collection of Jacob and his Twelve Sons by Francisco de Zurbarán. Each participant viewed high-resolution digital reproductions of the original artworks presented on the Tobii TX300 screen based eyetracker. The stimuli were presented in the same sequence for all participants.

## Results

Previous authors have shown that when a human being is portrayed in a painting, gazing behaviour is

mostly focused on the human figure, independently of contextual elements also depicted in the image. In particular, attention is given to the face area, and it plays a fundamental role in aesthetic judgment (Ro et al., 2007; Massaro et al., 2012; Villani et al., 2015). Given these considerations, three key regions of interest (ROI) were identified; the head, the clothes and the contextualising element. Saccades and fixations were identified offline in Tobii Studio using the default algorithm (onset/offset criterion of 70 degrees/second and a minimum dwell time of 80ms). The key variables of interest for each ROI were (1) Frequency of First Fixation, (2) Time to First Fixation and (3) Total Fixation Duration.

When comparing the first fixation data across the three participant groups (Museum Context group (MC), Aesthetic Context group (AC) and No Context group (NC)), it possible to see an interesting trend (Fig 1) that suggests that contextual labelling appears to change the proportion of participants fixating on the face. The study revealed that the AC labels succeeded in disbursing the gaze more effectively than those that are current MC labels. In all thirteen paintings, evidence shows that participant visual behaviour changed in response to the written interpretation. This suggests that an aesthetic context labelling approach is more successful in stimulating and/or training the gaze than one rooted in theological extrapolation.

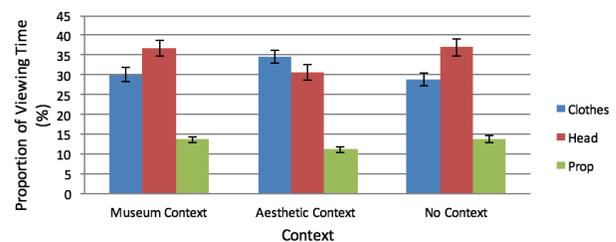


Figure 1: Graph highlighting the proportion of viewing time spent fixating on the face.

The pilot study also found that contextual labelling has a significant effect on influencing levels of aesthetic appreciation, and on the ways in which the gaze can be trained and/or manipulated to engage with areas of interest that would otherwise be overlooked. Reorienting the content of individual labels away from scripture and towards questions of aesthetics and interpretation produced a statistically significant reduction in aesthetic appreciation, which, given that the face is a key driver of aesthetic

judgements, is consistent with the finding that the aesthetic context also reduced the participants dwell time on the face.

This paper will also discuss a how participants identify and rank the artworks in terms of authenticity and value. By ranking compositions, we will cross-reference attitudes with the prices (all different) paid by Bishop Trevor at auction in 1756, considering how aesthetic tastes have changed.

## Summary and Conclusions

To date, studies of museum and gallery visitor behaviour primarily investigate how people behaviourally and cognitively respond to the design and layout of exhibits. However, they largely ignore the behavioural responses at the 'exhibit-face' (vom Lehn and Heath 2006) or the 'fat moment' (Garfinkel 1967) of visitors' action. Eye-tracking techniques have provided novel insights into the unconscious viewing processes of the 'fat moment' of the unique collection of Zurbarán artworks. The study highlighted statistically significant variations in levels of aesthetic appreciation. More importantly, the experiments indicated that by changing the written interpretation gaze can be redirected towards areas of conceptual significance, challenging the face bias which traditionally plays a fundamental role in aesthetic judgment.

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