The role and nature of Stimuli in aesthetic experience and art appreciation through the lens of scientific explorations:

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In the realm of aesthetic science and its explorations of art appreciation methodologies, the choice of stimuli precedes all research endeavours. While some Neuroaesthetics experiments incorporate artworks by specific artists, others utilize aesthetically crafted stimuli specific to their experiments or call for modified stimuli to curate the nature of the specificity within their experiments. The role of stimuli in scientific investigations is paramount, serving as a critical element in understanding behaviours, neural mechanisms or preferences that underline the experience, appreciation, and judgement in the perception of art. It is therefore pertinent to operate with careful consideration while curating the chosen stimuli as they form the foundations upon which researchers examine how artworks function as perceptual and aesthetic stimuli, ultimately aiming to establish the biological, physiological and/or psychological inferences in aesthetic experience.

An intriguing question arises through this reflection, regarding stimuli that inherently carry a predisposed notion of being considered ‘art’ while presenting stimuli in aesthetic experiments. How do we define the qualities of the stimuli presented for experiments to make them more relevant? This paper opens this discussion by delving into the significance of the nature and nuances of stimuli in scientific studies, while particularly examining the implications of utilizing stimuli with preconceived artist attributes.

Initiating the discussion, we evaluate a notable exploration involving a study conducted by Cutting, J.E(2003) wherein traditional works of art from the French Impressionism era serve as the main stimuli. The reason for choosing this study is its mention of ‘artist canon’ which the researcher defines as encompassing a culture’s esteemed works across various art forms, such as painting, architecture, literature, theatre, film etc. The research centers on the concept of mere exposure and its impact on the artist canon by focusing on the works of painter Gustave Caillebotte, a key contributor to the establishment of the French Impressionists canon in the late 19th century. The category of the chosen stimuli in the research considers artworks widely acknowledged and esteemed by culture. Cutting’s study explores the influence of cultural exposure specifically through art collections, on the preferences of both adults and children. The methodology for the study employed six naturalistic studies which investigated the effects of mere exposure to images from Gustave Caillebotte’s art collection. On the other hand, Cultural exploration was meticulously quantified through the frequencies of appearance of these images in library books and provided a quantitative metric for the level of cultural permeation. This study noted the correlating adult preferences with the variations in image frequencies underscoring the influential role of mere exposure in the perpetuation and maintenance of artistic canon.

While this study underscores the importance of considering the cultural context and exposure levels while evaluating aesthetic preferences, let us consider, another study that is in contrast with its consideration of stimuli from the research of Cutting. An exploration by Kirk. U, et al. (2020) investigate the impact of cognitive framing on emotional responses through a neuroscientific lens. The primary objectives of both studies are indeed different, however, for this essay, we will focus on the nature of the stimuli presented in the studies. The research by Kirk. U et al. involve

participants viewing images from the International Affective Picture System (IAPS) database, categorized as aversive and neutral, with the framing manipulations that present them as either ‘artworks’ or documentary photographs. The study explored how cognitive framing modulates neural activity in the Dorso Lateral Prefrontal cortex (DLPFC) and the Ventrolateral prefrontal cortex (VLPFC) and found a psychophysiological interaction analysis which demonstrated a correlation of VLPFC activity with amygdala activity in the art-frame group but not the participant group who were shown stimuli as documentary photographs. Although multiple studies incorporate the effective and proven database of the International Affective Picture System (IAPS) the reliance on emotional processing with manipulating the framing and the use of non-art specific stimuli question the consideration of the genuine artist merit in the presented stimuli. The contrast between the study by Cutting (2003) involving stimuli from Gustave Caillebotte’s art collection is that while both studies include static visual stimuli, the stimuli used in Kirk et al., study lack the focus on intrinsic artistic qualities. The question then would be, if the participants in the art group of the study were shown a static visual stimulus of carefully curated works of art which were high in artistic contrast with the images presented as documentary images in its framing manipulations, would the results still offer the same inferences? Contrary to Cutting’s study, rooted in traditional art delving into cultural influences on aesthetic preferences provided a richer exploration of artistic quality through its stimuli that were widely recognized as esteemed works of art; the utilitarian approach in the study by Kirk et al. focused on relevant parameters of cognitive processes and emotional responses but is limited in its capacity to engage with broader discussions on the nuanced, layered and subjective aspects of art appreciation.

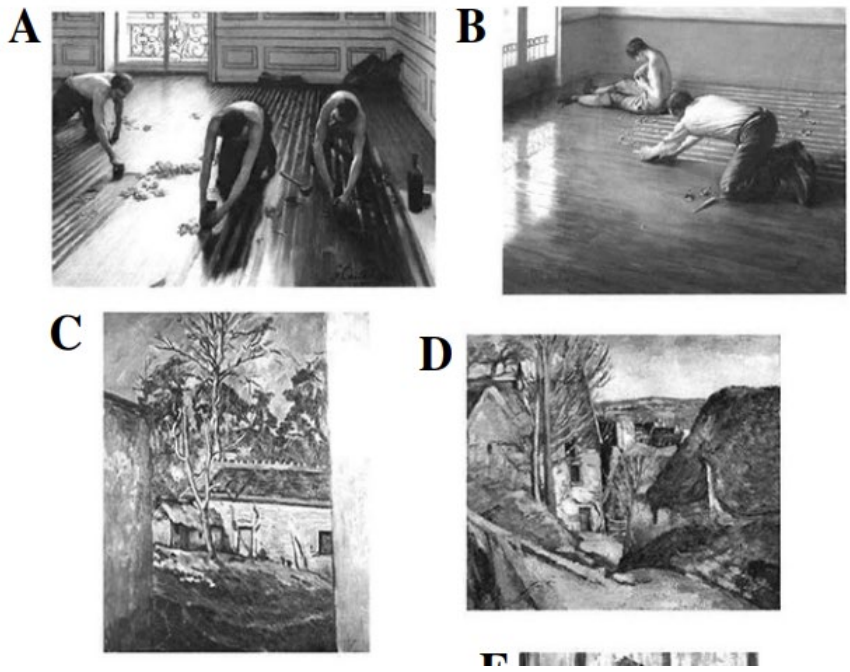

Figure 1: Stimuli in Cutting, J.E(2003) study; source: Cutting, J.E(2003)

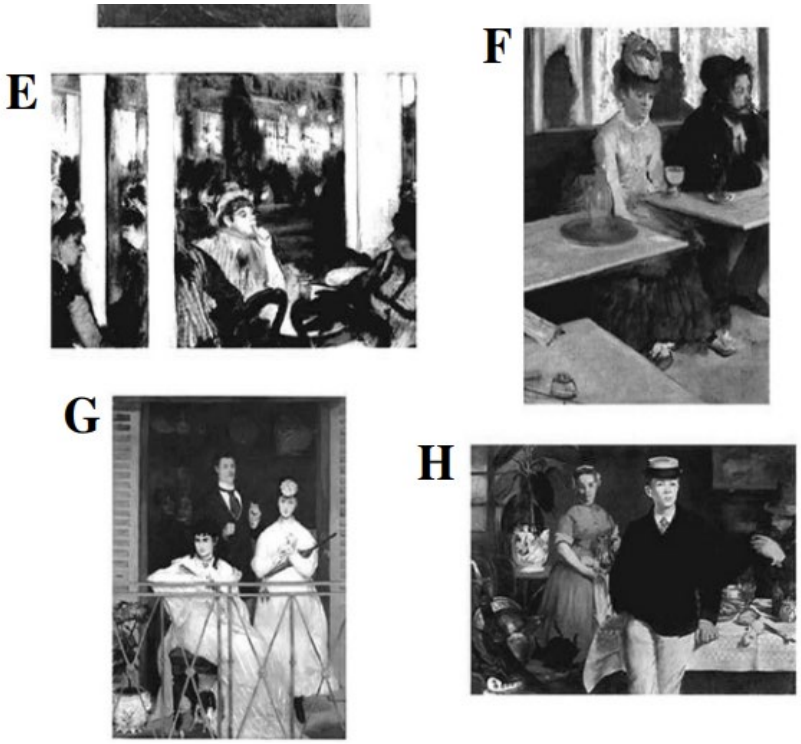

Figure 2: Stimuli in Cutting, J.E(2003) study; source: Cutting, J.E(2003)

Figure 3: Stimuli in Kirk, U. et al (2020) study; Source: Screenshot from the presentations in Aesthetic science module by Rebecca Chamberlain in the class on subjective aesthetics 2

This section explored the nature of stimuli itself and now, the following section explores the nuances of the nature of stimuli. The study of the nuances of stimuli in experiments conducted at laboratories involves a comparison of two studies and their stimuli, research by Sbriscia-Fioretti et al. (2013) and the research conducted by Chamberlain et al (2022) both of which delve into the realm of aesthetic science by examining the relationship between human action and embodied effects on art appreciation. The study by Sbriscia-Fioretti et al aims to link the sensorimotor cortical circuits to the aesthetics of abstract paintings by Franz Kline in contrast to the modified versions of the same painting recreated using Adobe Photoshop Software, both the original and modified versions were used as Stimuli. It might be pertinent to note that the modified versions of the paintings were recreated by the researchers while retaining the composition of the original artwork but removing the dynamic aspects of the original pieces relating to the artist's gestures purposefully. The stimuli involve presenting the participants with images of these abstract paintings (both original and modified) and exploring the consequences of hand gestures.

On the other hand, the research conducted by Chamberlain et al takes a more intricate approach in its methodology for its investigations on drawing actions and its outcomes. The study presented participants with visual stimuli of line drawing crafted using computational models replicating human-like drawing movements. By carefully manipulating characteristics such as line thickness to represent changes in the drawing speed or the variations in the initiation of a line, it delves into the finer nuances of the artistic creation and experience. In terms of its method, Sbriscia-Fioretti et al. 's study focuses on observing aesthetic responses to the visual outcomes of abstract paintings without the layers of details in the artistic process of its manipulated stimuli. While this provides insights into how the brain responds to the final visual stimuli provided, it lacks the depth to necessarily provide insight into the vast nature of embodied aesthetic experiences. In contrast, Chamberlain et al. meticulously consider and curate the kinematics of drawing actions which go beyond mere replication of the visual to capture the subtle nuances. They elevate the quality of the stimuli not only by replicating visual appearances but also by considering the layered dynamics of the artistic process. This approach towards the curation of stimuli recognizes that the artistic journey involves more than the finality of the created work of art. It incorporates a holistic understanding of aesthetic appreciation. While both studies undoubtedly advance aesthetic science explorations through their research, the marginality of intentions in the curation of the stimuli for the studies varies vastly.

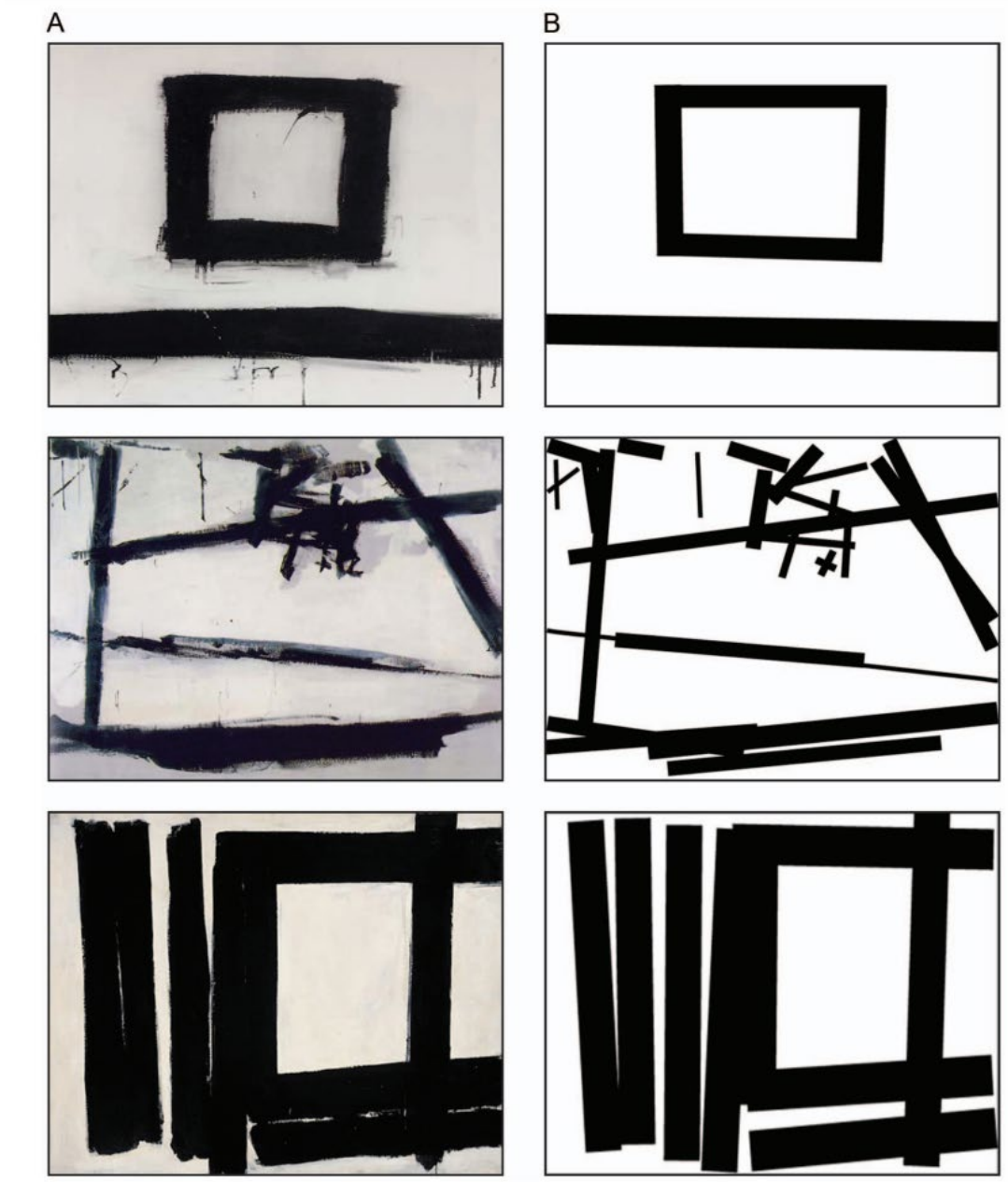

Figure 4: stimuli in Sbriscia-Fioretti et al. (2013) study; source: Sbriscia-Fioretti et al. (2013)

Figure 5: One of the stimuli (experiment 4) from Chamberlain et al (2021) study; Source: Chamberlain et al (2021)

These considerations in curating the stimuli become particularly evident while considering the challenges and limitations highlighted in the paper by Makin, A.D.J. (2017). In this paper, Makin underscored the attempts to understand human aesthetic experiences through scientific methods through the years, emphasizing the typical reductive and quasi-psychological nature of experiments in the field. He highlights the problem on the X and Y axes of aesthetic science experiments. On the Y axis, he elaborates on the challenges that lie in measuring the qualities of elusive and deeply emotional components of aesthetic experiences such as aesthetic rapture, a sense of sublime and intense fascination. Further, he explains how these 'hot' emotions of aesthetics are challenging to evoke in controlled laboratory settings. This leads to reliance on measuring 'cold' cognitive preference ratings instead.

To elaborate on the aspect of context mentioned in his Y axis, this study conducted by Gartus, A. & Leder, H. (2014) exemplifies the need for considering the context in aesthetic evaluations. The study investigates the context of street and museum, along with individual interests in modern art and graffiti art and their influence on aesthetic evaluations and emotions. This method of context-dependent approach aligns with Makin's emphasis on the emotional and contextual components of aesthetic experiences – Another factor in the consideration of curation of stimuli. Gartus and Leder find that individual preferences in specific art form significantly impacts liking and interest ratings and that of the context, whether in a street which they refer to as the grey cube or a museum which is referred to as the white cube

further modulate the influence of individual attitudes. This also highlights the contrast of the laboratory studies mentioned previously in the paper which further aspect the impression of stimuli. This study emphasizes the need to consider the context within which aesthetic stimuli are presented, supporting Makin's statement which asks for a more nuanced understanding that transcends reductive approaches and acknowledges the intricate role of factors in shaping aesthetic experiences. This highlights the argument of this essay on the need for careful consideration of the layers of artistic practice and artworks in curating the stimuli for scientific experiments.

On the X axis, the paper by Makin criticizes the reductive psychophysical approaches that assume lawful relations between stimulus dimensions and preferences. He states that this approach assumes independence and orthogonality among stimulus dimensions which he argues is implausible. He calls it the Gestalt nightmare which arises when attempting to understand how these dimensions interact, given that the human aesthetic faculties are likely tuned to balance the relationships within the whole.

While multi-dimensional attributes of stimulus in these experiments are complex, Mathew Pelowski and Fuminori Akiba's research (2011) is highly relevant in disseminating the threads of this complexity. The researchers highlight the importance of a nuanced study in aesthetic perception by proposing a five-stage model of art perception. This proposed model goes beyond the limitations of the analytic tradition, emphasizing the assimilation of information by introducing the five stages. The model is organized around initial disruption and subsequent meta-cognitive reflection and self-transformation. With this, it addresses the inadequacies in accounting for perceptual and conceptual change within the experience of art. By acknowledging the disruption, fundamental changes and epiphany, the research aligns with Makin's critique and indents the necessity for considering the complex interplay of emotional, cognitive, and appraisal factors in objective research on aesthetics. The common denominator in both Makin's paper and Pelowski's paper is that they strongly advocate for a more comprehensive understanding that transcends traditional approaches and recognizes the *profoundness of art* in its perception and self-reflection.

If these layers of art perception and self-reflection are to be grasped in scientific explorations, this essay urges that it is important to factor in the quality of the 'art' stimuli presented in these studies to nurture foundational intricacies of the stimuli upon which a broader conversation is built, blending the science of aesthetics and art appreciation. To summarize, the nature of the stimulus presented, while differing in its enquiry according to the studies as discussed, would gain more prominence, in explaining the process of curating the stimulus for the experiments. This elaboration would shed light on the nuances that have been considered in presenting the stimulus.

While it is difficult to define what constitutes a work of 'art' as stimuli, we could ponder upon Tolstoy's equally ambiguous statement on art, "..A real work of art destroys, in the consciousness of the receiver, the separation between himself and

the artist, nor that alone, but also between himself and all whose minds receive the work of art".

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