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Perceived Meaningfulness of Semantically Noncongruent Stimuli Increases in Art Context

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Abstract

The media occasionally report instances where people mistake ordinary objects for art. This often happens in art galleries or museums and might suggest that people attribute meaning differently depending on whether the context is artistic or rooted in everyday life. In this manuscript, we investigate how people attribute meaning to seemingly nonsensical sentences and images when they believe they are made by poets or artists. We used a collection of sentences that conclude with semantically congruent and noncongruent words, and a collection of images where the object is either congruent or noncongruent with the background. We randomly assigned participants to the baseline and experimental (art) conditions, telling participants in the art condition that the sentences/images were created by artists. Studies 1 and 2 found that the art context increases the perceived meaningfulness of noncongruent sentences ('Most cats see well at court'), but not the congruent ones ('Most cats see well at night'), while Study 3 found a similar effect regarding noncongruent images (a lion in an office) and congruent images (a lion in a field). Additionally, we discuss how individual differences in aberrant salience and religiosity moderate the main effects of the art context on meaning-making. These results advance our theoretical understanding of how art contexts affect the interpretation of meaning and the importance of semantic noncongruency.

Keywords

art, context, meaning, noncongruency, semantics

1. Introduction

A student once left a pineapple on an empty display stand as a prank at an art exhibition at Robert Gordon University. When he returned a few days later, he

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discovered that museum staff had placed the pineapple inside a glass display case, having mistaken it for an artwork (O'Connor, 2017). The media occasionally report similar instances in which people mistake ordinary objects for art (Hunt, 2016). This often occurs in art galleries or museums and might suggest that people attribute meaning differently depending on whether the context is artistic or rooted in everyday life. Meaning is a significant concept in art and aesthetics. Some philosophers suggest that artists do not create a fixed meaning that is later uncovered by the viewer; rather, the viewer makes or remakes the meaning of the artwork through active engagement (Barthes, 1971/1984; Gombrich, 1960; Wolfe 2024). Many researchers in aesthetics assume that the process of meaning-making involves "flexibility, … consideration of several factors simultaneously, awareness of viewpoints other than the egocentrical one, and integration of diversity into unity without divesting the parts of their heterogeneity and functional distinctness" (Kreitler and Kreitler, 1972), a point defended by Robert Stecker (1997, 2003). Moreover, the viewer's effort to interpret the artwork's meaning is particularly relevant to modern art (Zeki, 1999).

In psychological research, the role of meaning in aesthetic experience has been a subject of investigation. One of the most influential models in aesthetic appreciation – a model of aesthetic appreciation and aesthetic judgements – assumes a crucial role for the process of assigning meaning (Leder *et al*., 2004). A neurological theory of aesthetic experience also suggests that the act of assigning meaning to an artwork or achieving a better understanding of it results in a pleasurable experience and an increased perceived aesthetic value of the artwork (Ramachandran and Hirstein, 1999). Empirical research has demonstrated that adding titles that aid in understanding the meaning of an artwork (paintings, photographs) leads to increased aesthetic ratings of these artworks (Millis, 2001; Ruta *et al*., 2022). Similarly, providing viewers with information about abstract paintings has been shown to enhance the perceived meaningfulness and pleasingness of the paintings (Russell, 2003).

In an art context, categorizing an object as an artwork activates the art schema: a mental representation of what art is (Wagner *et al*., 2014). The art schema is related to greater value expectations: it activates an aesthetic appreciation process (Leder *et al*., 2004). Empirical research showed that when observing images with emotional content in an art context (believing that these images are artworks), individuals evaluate them more positively (Gerger *et al*., 2014). Moreover, when observing scientific depictions labelled as artworks, there is increased liking and more favourable aesthetic judgements (Papenmeier *et al*., 2024). Additionally, aesthetic settings (galleries, museums) increase aesthetic and emotional responses to art (Szubielska and Imbir, 2021).

These effects of the art schema on perception and emotion are so great that aesthetic enjoyment is even compatible with negative emotions: people experience images of repulsive objects more positively when they believe them to be artworks (Wagner *et al*., 2014). For this reason, one way the art schema may affect how people attribute meaning in an art context is by simply assigning greater meaning. However, it is also possible that this mechanism is not straightforward.

The art schema influences the way people interpret meaning through top-down processing (expectations about artworks affecting how stimuli are perceived; Pelowski *et al*., 2017). One of the major theories that develop the account of top-down processing on cognition and emotion is predictive processing. The predictive processing account of perception suggests that the brain does not passively register sensory information but actively anticipates it. Based on information in memory and the context of perception, it develops predictions about the probable cause of sensory input. These predictions are then compared with the actual sensory feedback, and in case of a mismatch, a prediction error occurs, which, in turn, updates the higher-level expectations, creating the most reasonable interpretation of sensory input. The predictive processing model has been applied to art, suggesting that artists intentionally create incongruities (prediction errors) whose effects viewers enjoy. Unlike in everyday life perception, viewers expect to be surprised when encountering art (Van de Cruys and Wagemans, 2011). This reasoning might suggest that the art schema affects the way people attribute meaning in an art context by attributing greater significance to semantically noncongruent stimuli compared to congruent ones.

Semantic congruency plays an important role in perception. Objects around us in the real world are not chaotic; they exist within a meaningful framework. For instance, it is more common to see a book than a lettuce in a library. Studies have demonstrated that pairs of stimuli sharing semantic congruence (e.g., tea–cup) elicit quicker responses than those lacking congruence (e.g., tea–sun; Meyer and Schvaneveldt, 1971 (see Note 1)). Scenes semantically consistent with an object (e.g., a farm and a horse) facilitate object recognition, as opposed to semantically nonconsistent scenes (e.g., a sea and a horse; Palmer, 1975). Semantics is important for multisensory perception as well: the specific meaning of an auditory cue facilitates visual object recognition (Chen and Spence, 2018; Lupyan and Ward, 2013).

Language and vision research often compares the perception of semantically congruent and noncongruent stimuli. Interestingly, it has been discovered that semantically noncongruent stimuli capture our visual attention: these inconsistent stimuli are looked at earlier, fixated on more frequently and for a longer time, than consistent ones (Coco *et al*., 2020; Henderson *et al*., 1999;

Loftus and Mackworth, 1978; Pedziwiatr *et al*., 2021; Võ *et al*., 2019). It is unclear what mechanism underlies these effects, and researchers have various suggestions to explain this phenomenon. Some assume that noncongruent stimuli provide more semantic information and thus may have greater meaning (informativeness) for the viewer (Henderson *et al*., 1999; Peacock *et al*., 2019). In a recent study, meaning maps were employed (Peacock *et al*., 2019) to test the hypothesis that inconsistent stimuli (images) carry more meaning (Pedziwiatr *et al*., 2021). Meaning maps depict the spatial distribution of scene semantics through participant ratings, while individuals assess the meaningfulness of various components (patches) within an image (Henderson and Hayes, 2017 – Note 2). Nonetheless, the study found that the way participants allocate meaning to inconsistent stimuli did not sufficiently clarify why these stimuli attract their attention (Pedziwiatr *et al*., 2023). In other words, participants did not necessarily find noncongruent parts of the image (which nevertheless attracted their visual attention) more meaningful.

Given that the interpretation of meaning holds a distinct role in aesthetics and is closely tied to both aesthetic value and pleasure, it is plausible that semantically inconsistent stimuli might be perceived as more meaningful within an artistic context than in nonartistic, everyday life contexts. Researchers theorize that when engaging with an artwork, individuals expect a deeper meaning, which might lead to a more intensive examination of the object (Danto, 1981, 2000). Aesthetic attitude theory suggests that in an art context, audiences "bring appropriate codes of interpretation and engagement to bear" (Cupchick, 2013, pp. 72–73). Previous research has indicated that pairs of semantically nonconsistent images are assessed as fitting together more within an art context than in an everyday life context (Iosifian and Wolfe, 2024). Moreover, finding meaning in two distantly connected or unrelated concepts plays an important role in creativity, which is significant for both art creation and perception. The Associative Theory of Creativity posits that creativity involves connecting remotely related concepts into novel combinations and facilitating weakly related, uncommon associations (Mednick, 1962; Simonton, 2013). An increasing number of studies indicate that greater semantic distance between words is positively related to creativity (Kenett, 2019). In other words, recognizing connections between two seemingly unrelated concepts is associated with creative thinking.

In the current study, we are examining the hypothesis that the presence of an art context enhances the perceived meaningfulness of semantically noncongruent stimuli. Investigating the effects of art context, empirical research has mostly focused on the emotional effects of art schema and found that art context increases positive emotional responses. However, cognitive effects of art schema are much less investigated. Additionally, while previous research

has predominantly concentrated on visual stimuli and visual arts, the present study explores both linguistic and visual stimuli, examining for the first time how labelling linguistic stimuli as poetry affects their interpretation. We anticipate that if a semantically noncongruent stimulus is presented as part of an artwork, its perceived meaningfulness will be heightened. Since the ability to assign meaning to semantically nonconsistent stimuli may vary as a function of individual differences, we will also consider individual differences by incorporating aberrant salience and religious beliefs as moderator variables. Aberrant salience denotes the atypical attribution of significance to seemingly trivial stimuli (Kapur, 2003). That is, stimuli that would ordinarily be considered insignificant gain elevated importance in the presence of aberrant salience (Bowers, 1968). Individuals experiencing aberrant salience often report an amplified sense of meaning, which could be linked to their inclination to ascribe heightened significance to seemingly insignificant details (Cicero *et al*., 2010). Thus, it is plausible that aberrant salience serves as a moderating factor, intensifying the impact of an art context on the perceived meaningfulness of stimuli. We anticipate that participants exhibiting pronounced aberrant salience, who also perceive a semantically noncongruent stimulus as part of an artwork, will attribute a greater degree of meaning to it compared to participants with lower levels of aberrant salience.

Lastly, individual differences in religiosity could potentially influence how individuals with religious and nonreligious backgrounds attribute meaning. Religion exerts an influence on how individuals perceive and construe reality, exhibiting a strong connection to the concept of meaning (Baumeister, 1991; McIntosh, 1995). Some scholars propose that religion impacts well-being, aspirations, and emotions by shaping the manner in which it bestows meaning upon certain aspects of life (George *et al*., 2002). Previous research has found that religious individuals tend to use religious attributions in everyday life (e.g., to explain everyday life behaviour; Lupfer *et al*., 1992). Thus, they might also use them when perceiving art, contrary to nonreligious people. We expect that religious participants who perceive a semantically noncongruent stimulus as a work of art will attribute greater meaning to it compared to nonreligious participants.

2. Study 1

Study 1 investigated how people attribute meaningfulness to a set of semantically congruent and noncongruent sentences. This study employed a between-participants design. Participants in the experimental group were informed that the sentences were extracted from poems, and the study aimed to explore how individuals perceive poetry. Participants in the baseline group did

not receive any information regarding the nature of the sentences. Individual differences in aberrant salience and religious beliefs were moderators of the main effect of the group on perceived meaningfulness.

2.1. Sample

Power analysis conducted in G*Power (Faul *et al*., 2007) indicated a minimal sample size of 140 participants (70 in each group) is required to detect differences between two independent groups with a medium effect size $d = 0.5$, $\alpha = 0.05$ and power = 0.9. We recruited 177 participants (from 18 to 76 years old, $M_{age} = 38.70$, SD = 12.66, 80 women, 97 men) on Prolific platform for online research. Participants were randomly assigned to art and baseline conditions. To ensure high-quality data, we preselected participants who have high rates of successful experiment completion (> 80% success rate). On Prolific platform, participants receive high/low rates based on how successfully they completed previous experiments/studies. This allowed us to preselect only participants with high rates of successful experiment completion.

2.2. Procedure

We used 54 sentences selected from a published stimulus set: sentence completion norms (Bloom and Fischler, 1980). This set includes sentences formed according to the close probability on the sentence's final word. Since its publication, the stimulus set was validated both in behavioural and EEG studies (Block and Baldwin, 2010). We selected 27 sentences with congruous endings ("*Jim wanted to change the way he looked*") and 27 sentences with incongruous endings ("*There's something grand about the onion*"). We aimed to select sentences which can be presented in both contexts: as being extracted from poems and generated to study language processing. Congruent sentences were matched in word length to noncongruent sentences. See Supplementary Table S1 for the complete list of selected sentences.

Participants in the 'art' group received the following instructions:

> "In this task, we are interested in how people perceive poetry. You will see 25 sentences from different poems written by professional poets, including free verse poetry, which is an open form of poetry that tends to follow the rhythm of natural speech. Your task is to evaluate these sentences."

Participants in the baseline condition received the following instructions:

> "In this task we are interested in how people process language. You will see 26 different sentences. Your task is to evaluate these sentences."

The sentences were initially introduced within a colour-recognition task. In this particular task, sentences were displayed for a very brief period, word

by word. Participants were required to identify the colour of the final word (Note 3). Following the colour recognition task, participants were asked to view and evaluate the perceived meaningfulness of each sentence. They were asked to rate the question, "How meaningful is this sentence?" on a slider scale ranging from 1 ('Not at all') to 100 ('Very much'). The sentences were exhibited in a random order, one by one, and remained on the screen until participants had provided their assessment of perceived meaningfulness.

Upon completing this task, participants were asked to complete the Aberrant Salience Inventory (ASI; Cicero *et al*., 2010). The ASI is a self-report questionnaire that measures the degree of aberrant salience. It contains 29 questions that require a yes or no response (e.g., *Has your sense of taste ever seemed more acute?*) and has high internal consistency (Cicero *et al*., 2010; in the present study: $\alpha = 0.92$). The total ASI score is the sum of 29 items (yes = 1 point, no = 0 points). Participants also completed the Centrality of Religiosity Scale (CRS; Huber and Huber, 2012). The CRS is a self-report questionnaire that measures the importance of religious meanings in personality. It contains 15 questions measuring the frequency and intensity of personal religious constructs (e.g., *To what extent do you believe that Gods, deities, or something divine exists?*), evaluated on a five-point Likert scale. Certain items had a different coding system, but were eventually coded on a five-point scale. The total CRS result is an average of the 15 items ($\alpha = 0.94$).

2.3. Results

Descriptive statistics are presented in Table 1. Participants in two conditions did not differ in aberrant salience ($p = 0.747$) and religiosity ($p = 0.515$).

We used mixed-effects modelling (*lme4* package for Linear Mixed Effects; Bates, Mächler, Bolker and Walker, 2015) since it enables estimating the main

Table 1.
Descriptive statistics in Study 1.

				Perceived meaningfulness	
Group		**ASI**	**CRS**	**Congruent sentences**	**Non-congruent sentences**
Art	*M*	12.76	2.03	79.60	23.25
	(SD)	(7.78)	(0.86)	(21.11)	(15.69)
Control	*M*	12.39	2.08	84.55	17.43
	(SD)	(7.30)	(0.89)	(17.73)	(12.07)
Total	*M*	12.56	2.06	82.26	20.13
	(SD)	(7.51)	(0.88)	(19.47)	(14.13)

Note. ASI, Aberrant Salience Inventory; CRS, Centrality of Religiosity Scale; SD, standard deviation.

effects of condition (art vs everyday) on perceived meaningfulness of congruent and noncongruent sentences while considering the random variance associated with differences between participants (Baayen, Davidson and Bates, 2008). Condition (art vs everyday) and sentence congruency (congruent vs noncongruent) were entered as a fixed factors, as well as their interaction. Random effects were associated with differences between the participants and sentences (see Table 2).

The main effect of condition on perceived meaningfulness was not significant (see Table 1). The interaction between condition and sentence congruency was significant. For congruent sentences, art condition marginally decreased perceived meaningfulness, $\beta = -0.10$ [−0.22, 0.02], $p = 0.091$. For noncongruent sentences, art condition significantly increased perceived meaningfulness, $\beta = 0.11$ [0.03, 0.19], $p = 0.006$.

We next tested how individual differences in aberrant salience and religiosity moderate effects of condition (art vs baseline) on perceived meaningfulness of congruent and noncongruent sentences. Aberrant salience did not moderate the effect of the condition on the perceived meaningfulness of congruent sentences, $p = 0.299$, but it did moderate the effect of the condition on the perceived meaningfulness of noncongruent sentences, $b = 0.08$ [0.00, 0.16], $p = 0.041$. The effect of the condition on the perceived meaningfulness of noncongruent sentences was not significant among participants with

Table 2.
Perceived meaningfulness as a function of condition (art vs everyday) and sentence congruency in Study 1.

	Unstandardized			**Standardized**	
	Estimate	**SE**	***p***	**Std coef.**	**95% CI**
Fixed effects					
Intercept	51.21	1.29	< 0.001	−0.01	[−0.06, 0.06]
Condition	0.22	0.81	0.789	0.01	[−0.03, 0.04]
Noncongruency	−30.87	1.02	< 0.001	−0.77	[−0.82, −0.72]
Condition* Noncongruency	2.69	0.24	< 0.001	0.07	[0.06, 0.08]
Random effects	Variance	SD			
ID (intercept)	106.42	10.32			
Sentence (intercept)	54.06	7.35			
Residual	480.08	21.91			

Note. Condition = art (coded as +1) vs everyday (coded as −1) conditions. Noncongruency = congruent (coded as −1) vs noncongruent (coded as +1) sentences. ID = participants. Model Equation: Meaning ~ Condition * Congruency + (1) | ID) + (1) | Sentence). Model fit: R^2 marginal = 0.60, R^2 corrected = 0.70, Akaike Information Criterion (AIC) = 86756, Bayesian Information Criterion (BIC) = 86806. CI, confidence interval; SD, standard deviation; SE, standard error.

low aberrant salience (< 5), $p = 0.797$. By contrast, among participants with high aberrant salience (> 20) this effect was significant, $b = 0.20$ [0.03, 0.38], $p = 0.030$. Moderation effects of religiosity on congruent and noncongruent sentences were not significant, ps < 0.692.

2.4. Discussion

Study 1 investigated how individuals attribute meaning to congruent and noncongruent sentences in the context of art (poetry) compared to everyday life. Consistent with our hypothesis, the art context heightened the perceived meaningfulness of noncongruent stimuli. Additionally, the meaningfulness of congruent sentences in the art condition showed a marginal decrease. This finding is in line with earlier research which demonstrated that the evaluation of art objects is related to higher ambiguity and lower understanding (Haertel and Carbon, 2014).

Aberrant salience, albeit marginally, moderated the main impact of the art context on noncongruent stimuli meaningfulness. Aberrant salience could potentially enhance the inclination to attribute meaning to innocuous stimuli within an artistic context. Earlier studies have indicated that aberrant salience attribution is associated with the detection of meaningful patterns within random noise (Catalan *et al*., 2018). Our findings suggest that this effect can be heightened in specific contexts, such as an art context.

3. Study 2

Study 2 was a between-participants study which replicated findings of Study 1 on a different set of sentences. Participants in art and control conditions viewed sentences, all with incongruous endings, and were asked to evaluate their meaningfulness. Individual differences in aberrant salience and religious beliefs were moderators of the main effect of condition on perceived meaningfulness.

3.1. Sample

Power analysis conducted in G*Power (Faul *et al*., 2007) indicated a minimal sample size of 140 participants (70 in each group) is required to detect differences between two independent groups with a medium effect size $d = 0.5$, $\alpha = 0.05$ and power = 0.9. We recruited 191 participants (from 20 to 76 years old, $M_{age} = 41.04$, SD = 14.00, 102 women, 88 men, one did not report their gender) on Prolific platform for online research. Participants were randomly assigned to art and baseline conditions. To ensure high-quality data, we preselected participants who have high rates of successful experiment completion (> 80% success rate). On Prolific platform, participants receive

high/low rates based on how successfully they completed previous experiments/studies. This allowed us to preselect only participants with high rates of successful experiment completion.

3.2. Procedure

We used 26 sentences selected from a published stimulus set (Bloom and Fischler, 1980). All sentences had incongruous endings. See Supplementary Table S2 for the complete list of selected sentences. Participants in the 'art' condition were told that the study investigated how people perceive poetry, and sentences were derived "from different poems written by professional poets, including the free verse poetry: open form of poetry which tends to follow the rhythm of natural speech", similar to Study 1 (see above). Participants in the control condition were told that the study investigated how people process language and did not receive any information as to the nature of the sentences. The main task was the same as described in Study 1. The stimuli were presented in a random order.

Upon completing this task, participants were asked to complete the Aberrant Salience Inventory (ASI; Cicero *et al*., 2010; $\alpha = 0.90$) and the Centrality of Religiosity Scale (CRS, Huber and Huber, 2012; $\alpha = 0.93$).

3.3. Results

Descriptive statistics are presented in Table 3. Participants in two conditions did not differ in aberrant salience ($p = 0.411$) and religiosity ($p = 0.386$).

Similar to Study 1, a mixed effect model was built to estimate the main effects of condition (art vs everyday) on perceived meaningfulness of noncongruent sentences while considering the random variance associated with differences between participants (Baayen, Davidson and Bates, 2008). Condition (art vs everyday) was entered as a fixed factor; random effects were associated with differences between the participants and sentences (see Table 4).

Table 3.
Descriptive statistics in Study 2.

Group		ASI	CRS	Perceived meaningfulness
Art	*M*	13.06	1.95	38.62
	(SD)	(6.75)	(0.78)	(14.72)
Control	*M*	12.24	2.05	26.88
	(SD)	(7.03)	(0.88)	(14.48)
Total	*M*	12.68	1.99	33.15
	(SD)	(6.88)	(0.83)	(15.71)

Table 4.
Perceived meaningfulness as a function of condition (art vs everyday) in Study 2.

	Unstandardized			Standardized	
	Estimate	**SE**	***p***	**Std coef.**	**95% CI**
Fixed effects					
Intercept	32.81	2.34	< 0.001	−0.01	[−0.16, 0.16]
Condition	5.93	1.06	< 0.001	0.21	[0.13, 0.28]
Random effects	Variance	SD			
ID (intercept)	196.1	14.00			
Sentence (intercept)	113.4	10.65			
Residual	495.5	22.26			

Note. Condition = art (coded as +1) vs everyday (coded as −1) conditions, ID = participants. Model Equation: Meaning ~ Condition + (1) | ID) + (1) | Sentence). Model's fit: R^2 marginal = 0.04, R^2 corrected = 0.41, Akaike Information Criterion (AIC) = 45471, Bayesian Information Criterion (BIC) = 45504. CI, confidence interval; SD, standard deviation; SE, standard error.

The main effect of condition on perceived meaningfulness was significant (see Table 2), indicating that art condition significantly increased perceived meaningfulness of sentences.

We next tested how individual differences in aberrant salience and religiosity moderate effects of condition (art vs baseline) on perceived meaningfulness of noncongruent sentences. Aberrant salience did not moderate the effect of the condition on the perceived meaningfulness of sentences, $p = 0.425$, and neither did religiosity, $p = 0.204$.

3.4. Discussion

Study 2 replicated the findings of Study 1, confirming that the art context increases the perceived meaningfulness of noncongruent semantic stimuli. Similar to Study 1, differences in religiosity did not moderate the main effects. However, Study 2 did not confirm the moderating role of aberrant salience in the main effects. This suggests that the main effect of an increased tendency to attribute meaning to noncongruent stimuli in an art context is generalized across people with varying degrees of proneness to aberrant salience and religiosity.

The observed effect of the art context on perceived meaningfulness, as outlined in Studies 1 and 2, is tied to linguistic stimuli. To comprehend whether and how this effect extends to other art forms, it becomes important to examine it across diverse types of art stimuli. For instance, would the same augmented perceived meaningfulness effect arise if individuals assessed semantically noncongruent images under the belief that they were artworks?

4. Study 3

Study 3 was a between-participants study which tested if findings of Studies 1 and 2 can be extended on visual stimuli: semantically congruent and noncongruent visual scenes. Specifically, the study aimed to confirm that the observed effect of art context occurs only with noncongruent stimuli and does not generalize to congruent stimuli. Participants observed semantically congruent visual scenes (animals in natural context, manufactured objects in man-made context) and noncongruent visual scenes (animals in man-made context, manufactured objects in natural context). The were asked to evaluate how meaningful these images are. Participants randomly assigned in the art condition were told that the images were artworks, while participants randomly assigned to the baseline condition did not receive any information on the image's nature. Individual differences in aberrant salience and religious beliefs were moderators of the main effect of condition on perceived meaningfulness.

4.1. Sample

Power analysis conducted in G*Power (Faul et al., 2007) indicated a minimal sample size of 140 participants (70 in each group) is required to detect differences between two independent groups with a medium effect size $d = 0.5$, $\alpha = 0.05$ and power = 0.9. We recruited 201 participants (from 18 to 78 years old, $M_{age} = 39.17$, SD = 13.64, 72 women, 127 men, one nonbinary, one did not report their gender) on Prolific platform for online research. Participants were randomly assigned to art and baseline conditions. To ensure high-quality data, we preselected participants who have high rates of successful experiment completion (> 80% success rate).

4.2. Procedure

We used 80 images of visual scenes selected from a published stimulus set used in previous studies which investigated incongruent object/context relationships in visual scenes (Joubert *et al.*, 2008; Rémy *et al.*, 2014). Each image (768 × 512 pixels horizontal colour scene) contained either an animal (e.g., elephant, lion) or a man-made object (e.g., chair, vehicle) pasted in a background context. Background context was either a natural landscape (e.g., fields, mountains) or man-made environment (e.g., indoor scenes, cityscapes). We used 40 images with object/background congruency (animals in natural contexts, manufactured objects in man-made contexts) and 40 images with object/background noncongruency (animals in man-made contexts, manufactured objects in natural contexts). We aimed to select images which can be presented in both contexts: art and control condition. In the main task, each object (animal or manufactured object) only appeared once, either in a congruent

Figure 1. Examples of noncongruent images used in Study 3: illustrations of images similar to those used in Study 3. On the left: a man-made object in a natural background. On the right: an animal in a man-made background.

or noncongruent background. Thus, each participants observed 20 congruent images and 20 noncongruent images presented in a random order (see Fig. 1). See Supplementary Table S3 for the complete list of selected images.

Participants in the 'art' condition received the following instructions:

> "We are interested in how people perceive contemporary art. You will see 40 scenes made by a professional artist. They were exhibited in a contemporary art gallery during the exhibition 'Civilization: The Way We Live Now'."

Participants in the control condition did not receive any information as to the nature of the images. Each image was presented in a random order, and participants were asked to evaluate its meaningfulness on a five-point scale from (0) to 4 (Very much).

Upon completing this task, participants were asked to complete the Aberrant Salience Inventory (ASI; Cicero *et al.*, 2010; $\alpha = 0.91$) and the Centrality of Religiosity Scale (CRS, Huber and Huber, 2012; $\alpha = 0.97$).

4.3. Results

Descriptive statistics are presented in Table 5. Participants in the two conditions did not differ in aberrant salience ($p = 0.411$) and religiosity ($p = 0.368$).

Similar to Studies 1 and 2, a mixed-effect model was built to estimate the main effects of condition (art vs everyday) on perceived meaningfulness of images while considering the random variance associated with differences between participants (Baayen, Davidson and Bates, 2008). Condition (art vs everyday) and image congruency (congruent vs noncongruent) were entered

Table 5.
Descriptive statistics in Study 3.

Group		ASI	CRS	Perceived meaningfulness	
				Congruent images	Non-congruent images
Art	*M*	12.52	2.09	1.15	0.62
	(SD)	(6.94)	(0.99)	(0.84)	(0.62)
Control	*M*	11.85	2.14	1.37	0.47
	(SD)	(7.45)	(1.02)	(1.01)	(0.64)
Total	*M*	12.19	2.12	1.26	0.54
	(SD)	(7.19)	(1.00)	(0.94)	(0.64)

Table 6.
Perceived meaningfulness as a function of condition (art vs everyday) and image congruency in Study 3.

	Unstandardized			Standardized	
	Estimate	SE	*p*	Std coef.	95% CI
Fixed effects					
Intercept	0.90	0.04	< 0.001	−0.01	[−0.10, 0.10]
Condition	−0.02	0.04	0.727	−0.01	[−0.09, 0.06]
Noncongruency	−0.36	0.01	< 0.001	−0.31	[−0.37, −0.24]
Condition* Noncongruency	0.09	0.01	< 0.001	0.08	[0.06, 0.10]
Random effects	Variance	SD			
ID (intercept)	0.38	0.62			
Image (intercept)	0.11	0.34			
Residual	0.72	0.85			

Note. Condition = art (coded as +1) vs everyday (coded as −1) condition, Noncongruency = noncongruent (coded as +1) vs congruent (coded as −1) vs images. ID = participants. Model Equation: Meaning ~ Condition * Congruency + ((1) | ID) + (1) | Image). Model's fit: R^2 marginal = 0.10, R^2 corrected = 0.47, Akaike Information Criterion (AIC) = 21085, Bayesian Information Criterion (BIC) = 21134. CI, confidence interval; SD, standard deviation; SE, standard error.

as fixed factors, as well as their interaction. Random effects were associated with differences between the participants and the images (see Table 6).

The main effect of condition on perceived meaningfulness was not significant (see Table 3). The interaction between condition and image congruency was significant. Art condition increased the meaningfulness of noncongruent stimuli, albeit not significantly, $\beta = 0.08$ [−0.02, 0.19], p = 0.107. Art condition decreased the meaningfulness of congruent stimuli, albeit not significantly, $\beta = -0.08$ [−0.18, 0.02], $p = 0.105$. We next tested how individual differences in aberrant salience and religiosity moderate effects of condition

(art vs baseline) on perceived meaningfulness of congruent and noncongruent images. Aberrant salience did not moderate the effect of the condition on the perceived meaningfulness of images, ps > 0.938.

Individual differences in religiosity moderated the main effect of condition on perceived meaningfulness of noncongruent images, $\beta = 0.10$ [0.00, 0.21], $p = 0.049$. Among religious participants, art condition marginally decreased perceived meaningfulness of noncongruent images, $\beta = -0.27$ [−0.53, −0.01], $p = 0.051$. Among nonreligious individuals, art condition significantly increased perceived meaningfulness of noncongruent images, $\beta = 0.28$ [0.03, 0.53], $p = 0.044$. Individual differences in religiosity moderated the main effect of condition on perceived meaningfulness of congruent images as well, $\beta = 0.15$ [0.06, 0.25], $p = 0.002$. Among religious participants, art condition decreased perceived meaningfulness of congruent images, $\beta = -0.31$ [−0.54, −0.07], $p = 0.016$. Among nonreligious individuals, art condition did not affect perceived meaningfulness of congruent images, $\beta = 0.28$ [−0.08, 0.63], $p = 0.148$.

4.4. Discussion

Study 3 found that the effects of art context on perceived meaningfulness of sentences extend to visual stimuli (images). Similar to Study 1, the effect of art context had a tendency to increase meaningfulness of semantically noncongruent stimuli but decrease the meaningfulness of semantically congruent stimuli. This confirms that art context does not merely increase meaningfulness of any stimuli, but stimuli with semantic noncongruency.

While Study 3 did not find any moderation effects of aberrant saliency, it did find significant moderation by religiosity. The observed effects of art context on semantically congruent and noncongruent stimuli were seemingly reversed among individuals with high level of religiosity.

5. General Discussion

This study investigated how the art context affects the perceived meaningfulness of semantically congruent and noncongruent stimuli. Across three studies, participants evaluated semantically noncongruent (but not congruent) stimuli as more meaningful when they were told that these stimuli were made by artists. These findings contribute to our understanding of art cognition versus everyday cognition. It is sometimes assumed that when naïve viewers engage with art, their perception of art is merely an extension of their perception in everyday life (Cupchik and Gebotys, 1988). However, our findings suggest that naïve viewers (as we did not recruit participants with art expertise) attribute meaning differently in an art context compared to an everyday life context.

Our findings challenge earlier research that did not observe art-specific cognitive schema effects on meaningfulness judgements and gaze behaviour (Papenmeier *et al*., 2024). Specifically, gaze behaviour and meaningfulness were found to differ only as a result of bottom-up processes (when the observed image was an actual artwork), but not when participants were merely told that an image was an artwork while it was not (top-down processes). Since we only found differences in semantically noncongruent stimuli, this might explain why earlier research, which did not investigate this dimension, missed the influence of art-specific cognitive schemata.

At the same time, this finding aligns with the concept of the beholder's share. It suggests that when engaging with art, viewers anticipate surprising elements and are eager to uncover new meanings. Consequently, they are more motivated to explore and resolve the ambiguity within the artwork (Kallio-Tavin *et al*., 2021, p. 132). Understanding the mechanism underlying the impact of the art context on perceived meaningfulness is of significant importance. One explanation for the heightened meaningfulness within the art context could be associated with framing effects. When individuals engage with art, they anticipate a pleasurable and rewarding experience (Kirk *et al*., 2009). Research has indicated that labelling an artwork as originating from a prestigious museum can amplify both perceived meaningfulness and aesthetic appreciation (Cupchik *et al*., 1994; Leder *et al*., 2006; Russell, 2003; Silveira *et al*., 2015). Therefore, it is conceivable that observing noncongruent sentences within the context of poetry enhances both their aesthetic value and the perceived meaningfulness connected to it. However, this explanation has significant limitations, as the art context did not enhance the perceived meaningfulness of all stimuli, but only of semantically noncongruent ones.

Another plausible explanation for the heightened meaningfulness within the art context could be linked to the predictive processing theory and the nature of art. Semantically noncongruent stimuli contradict our expectations and create prediction errors. However, in art context violations of expectation may create different outcomes, including attributing greater meaning. For instance, as some researchers suggest, compared to prose, poetry tends to be relatively opaque; comprehending it presents greater challenges and provides more opportunities for interpreting meaning (Jakobson, 1960; Johnson-Laird and Oatley, 2022). Consistent with this perspective, Study 1 revealed that the effect of the art context was exclusively observed in noncongruent sentences, and this effect was reversed in congruent ones. This observation might indicate that semantic noncongruency hinders a straightforward understanding of meaning but allows for broader and more creative interpretations. In line with this reasoning, research found that object noncongruent environments (e.g., a book in a car workshop) produce more original ideas and higher cognitive flexibility (van Hooijdonk *et al*., 2022).

Figurative vs literal interpretation of sentences and images is another mechanism which might explain our findings. Earlier research discovered that the symbolic meanings of objects are more readily accessible cognitively in an art context when compared to an everyday life context (Iosifyan and Wolfe, 2024). Consequently, it is plausible that when participants engaged with semantic noncongruency in the art context, they were more inclined to actively seek a nonliteral, symbolic, or metaphorical interpretation of it. This, in its turn, increased perceived meaningfulness of noncongruent sentences and images. For example, the meaningfulness of the noncongruent sentence "*The lecture should last about one cigarette*" could potentially increase once it is understood figuratively rather than literally. Metaphor is a pivotal characteristic of literature and poetry (Holyoak, 2019). Poems are replete with novel metaphors and symbols. These metaphors and symbols often encompass semantic incongruencies that can be resolved when their meanings are understood nonliterally.

The impact of the art context on perceived meaningfulness was only influenced by individual differences in aberrant salience in Study 1. This might suggest that individuals with increased attention to innocuous stimuli are particularly prone to ascribing greater significance to artworks. However, since this finding lacked support in Studies 2 and 3, further research on this question is needed. It is thus possible that individual differences in creativity are more relevant to the effect of an art context on perceived meaningfulness of noncongruent stimuli.

Both creativity and aberrant salience are characterized by attributing importance to seemingly irrelevant information (Gray *et al*., 2002; Torrance, 1972). However, in the context of creativity, directing attention to irrelevant stimuli can be viewed as a mechanism of creative problem-solving, aiding creative individuals in discerning what others might overlook. In contrast, aberrant salience is regarded as a dysfunctional salience attribution, leading to delusions and hallucinations. Consequently, it is possible that individual differences in creativity are more pertinent to the influence of the art context on the perceived meaningfulness of noncongruent stimuli.

These individual differences could involve trait creativity and openness to experience. Trait creativity encompasses divergent thinking and feeling, including imagination and curiosity, along with other personality variables that influence an individual's creativity (Li *et al*., 2015; Liu *et al*., 2011; Williams, 1993). Openness to experience is a personality trait that is positively correlated with creativity (Ivcevic and Brackett, 2015; van Tilburg *et al*., 2015). Individuals who are open to experiences tend to engage more frequently in creativity-related activities (Tan *et al*., 2019). It is plausible that within an art context, individuals with high levels of trait creativity and openness to experience might be inclined to perceive noncongruent stimuli as more meaningful.

Moreover, previous studies have established that openness to experience is positively related to aesthetic appreciation, advanced styles of aesthetic judgement, aesthetic chills, awe, and art interest (Afhami and Mohammadi-Zarghan, 2018; Jola *et al*., 2014; McCrae, 2007; Silvia and Nusbaum, 2011; Silvia *et al*., 2015). Another individual trait of interest is aesthetic responsiveness, which reflects differences in how individuals respond to art (Schlotz *et al*., 2021).

Although religiosity did not moderate the main effects in this study, this result may be due to the insufficient number of religious individuals in our sample. Across three studies, the majority of our participants were non-religious, with average CRS scores ranging from 1.99 to 2.12, indicating a predominantly nonreligious sample. Future studies should aim to include participants with varying levels of religiosity.

Studies described in this paper have limitations that warrant consideration. Firstly, participants in all studies were informed that the stimuli they were evaluating were artworks. Nonetheless, we did not verify the success of this manipulation or confirm if participants genuinely believed the sentences/images were created by artists.

Future studies could investigate how the art context vs the everyday context influences eye gaze patterns during the observation of semantically noncongruent stimuli. Earlier eye-tracking investigations revealed that participants' attribution of meaning to inconsistent stimuli did not fully elucidate why these stimuli captured their attention (Pedziwiatr *et al*., 2022). However, considering the contextual differences (art context vs everyday life context) might help bridge this gap. It is conceivable that within an art context, the allocation of meaning to semantically inconsistent stimuli is positively correlated with heightened attention allocation (e.g., longer fixations).

Since we are interested in the effects of context on stimulus interpretation, it is important to note that the current study was conducted in a laboratory setting. Research has shown that artworks presented in a museum are liked more and rated as more interesting than those presented in a lab (Grüner *et al*., 2019). Aesthetic appreciation and emotions experienced in a lab differ from those experienced in a gallery (Szubielska *et al*., 2021). Therefore, future studies investigating this effect might benefit from including museum or gallery settings and incorporating various art forms (e.g., installations, conceptual art) to test the generalizability of the current findings.

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Conflict of Interest

The authors declare to have no known competing interests that could appear to influence the work reported in this document.

Ethics

All studies described in this paper were approved by the University of St Andrews School of Psychology & Neuroscience Ethics Committee, approval code PS16745.

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Supplementary Material

Supplementary material is available online at:
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Notes

1. In this study, a lexical decision task was employed in which participants were asked to determine whether both strings presented on the screen were words by pressing a 'Yes' or 'No' key. Reaction times were recorded.
2. In this study, meaningfulness was measured by self-report on a six-point Likert scale ('very low', 'low', 'somewhat low', 'somewhat high', 'high', 'very high').
3. This study is part of a broader research project, and the outcomes of the colour-recognition task will be outlined in a separate paper dedicated solely to that task. As a result, the present paper will concentrate exclusively on the results and analysis of the perceived meaningfulness task.

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