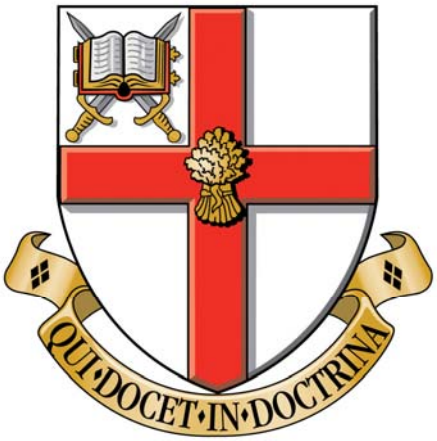

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Shared liking and association valence for representational art but not abstract art

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Abstract

We examined the finding that aesthetic evaluations are more similar across observers for representational images than for abstract images. It had been proposed that a difference in convergence of observers' tastes was due to differing levels of shared semantic associations [Vessel, E.A. and Rubin, N., 2010, Beauty and the beholder: Highly individual taste for abstract, but not real-world images. *Journal of Vision*, 10 (2), 1-14]. In Experiment 1, student participants rated 20 representational and 20 abstract artworks. We found that their judgments were more similar for representational than abstract artworks. In Experiment 2, we replicated this finding, and also found that valence ratings given to associations and meanings provided in response to the artworks converged more across observers for representational than for abstract art. Our empirical work provides insight into processes that may underlie the observation that taste for representational art is shared across individual observers, while taste for abstract art is more idiosyncratic.

KEYWORDS: AESTHETIC APPRECIATION; SEMANTIC ASSOCIATION; VALENCE; ART; INDIVIDUAL DIFFERENCES

Introduction

What people find beautiful governs decisions and behavior in a wide range of circumstances, and understanding the nature of aesthetic preferences is an important challenge to psychologists. The field of aesthetics has traditionally used works of art as a test-bed for theories, though theories of aesthetics also apply to every-day objects and consumer items and have many applications.

In broad terms, the aesthetic appreciation of a work of art has been found to be influenced by two factors: the visual properties of the work of art, and the cognitive and emotional attributes of the individual observing the artwork (Leder, Belke, Oeberst, & Augustin, 2004; Lindell & Mueller, 2011; Reber, Schwarz, & Winkielman, 2004). Among the many properties of an artwork that influences aesthetic appreciation are its complexity (Berlyne, 1974; Nadal, Munar, Marty, & Cela-Conde, 2010), contrast (Ramachandran & Hirstein, 1999) symmetry (Frith & Nias, 1974; Humphrey, 1997; Jacobsen & Hofel, 2002), and color (Martindale & Moore, 1998) with color acquiring, through a process of association, the positive or negative valence of objects that typically have that color (Palmer & Schloss, 2010; Palmer, Schloss, & Sammartino, 2013; Taylor, Schloss, Palmer & Franklin, 2013). Attributes of the perceiver that influence an aesthetic experience include their expertise (Leder, Gerger, Dressler, & Schabmann, 2012; Winston & Cupchik, 1992), understanding and knowledge (Gordon, 1952; Martindale, 1984), their familiarity with the art (Berlyne, 1970), personality (Feist & Brady, 2004), current emotional state and mood (Forgas, 1995), cognitive analysis (Leder, et al., 2004) and ease with which they perceive the art (Forster, Leder & Ansorge, 2013; Reber et al., 2004; Zajonc, 1980). It is therefore clear that many factors influence aesthetic appreciation and a detailed model of how these operate to govern an aesthetic response has been provided by Leder, et al. (2004) (for reviews see also Jacobsen, 2010; Leder, 2013; Lindell & Mueller, 2011; Palmer, Schloss, & Sammartino, 2013).

Given the complex interplay between the visual attributes of a work of art, a person's individual characteristics, and even the social context in which the art is viewed (Leder et al. 2004), it might be expected that aesthetic preferences will always be highly subjective and difficult to predict. However, one aspect of an artwork that influences liking in a highly consistent and predictable way is its level of representational content. It has frequently been found that representational art is liked more than abstract art (Gordon, 1952; Heinrichs & Cupchik, 1985; Landau, Greenberg, Solomon, Pyszczynski, & Martens, 2006; Mastandrea, Bartoli, & Carrus, 2011; Winston & Cupchik, 1992; see also Leder, et al., 2012). As Landau et al. (2006) suggest, a possible reason for this is that people do not like art (or other items) that they find meaningless (Leder et al. 2004; Leder, Carbon, & Ripsas, 2006; Martindale, 1984). In fact, Martindale (1984) suggests in his 'meaning from art' proposal, that the number and diversity of associations elicited by a work of art reflect a person's understanding and determine the level of aesthetic appreciation, with a large number of diverse associations producing maximum pleasure.

Clearly, a feeling of meaninglessness in response to a work of art may depend on the experience and personality of the observer (Landau et al., 2006; Leder et al., 2004) and evidence indicates that a greater liking of abstract art is associated with greater knowledge and expertise of art (Gordon, 1952; Hekkert & van Wieringen, 1996; Winston & Cupchik, 1992), higher levels of education, and greater openness to ideas (Feist & Brady, 2004; see also Leder et al., 2012). If viewers are able to find meaning, or if they are experienced with abstract art, then this increases their appreciation of abstract art (Feist & Brady, 2004; Landau et al., 2006; Leder et al., 2012). However, naïve observers of art predictably prefer representational artworks to abstract artworks (Winston & Cupchik, 1992).

A further difference between the aesthetic appreciation of representational and abstract images was recently reported by Vessel and Rubin (2010). Vessel and Rubin examined the consistency of preferences for photographs of realistic scenes versus abstract scenes

(pictures taken from a range of sources, including geological images, 3D rendering software, microscopic images, fractal images and kaleidoscopic images). They found that the aesthetic appreciation of realistic images was more consistent across observers than that of abstract images. Therefore, in addition to abstract images being liked less, people appear to have a more varied response to them.

Vessel and Rubin explain the higher agreement in preferences for representational compared to abstract images as being caused by the meaning and associations elicited by the different types of images. They suggest that semantic associations are more likely to be shared between individuals for meaningful/realistic images (e.g. a scenic view) than abstract images, and that the valence of the associations elicited influences the preferences for the images. For example, most people when viewing a photograph of a scenic garden will have a pleasant association which may result in a positive evaluation of the photograph (see also Leder et al., 2004). Conversely, looking at a photograph of a concrete car park may elicit a negative association and result in a more negative evaluation of the photograph. This process may cause preferences to be consistent across observers for representational images. In contrast, Vessel and Rubin argue, responses to abstract images are likely to be more variable and highly subjective, and the individual nature of the associations elicited causes the preferences for the images to be more variable. If valid, Vessel and Rubin's (2010) findings are important in furthering our understanding of aesthetic appreciation as they suggest that the valence of the semantic association elicited by an image may be a major influence in determining aesthetic appreciation.

The aim of the current work was to further examine the cross-observer similarity of the appreciation of representational as opposed to abstract images. To investigate a number of additional questions that arise from Vessel and Rubin's work, we made several changes to the methodology. First of all, we wanted to explore whether Vessel and Rubin's observations applied to evaluations of artworks. Vessel and Rubin (2010) used photographs and images

that were of a photo-realistic appearance rather than works of art and, while similar results can be predicted for artworks, this may not be the case because works of art are rarely as accurate in their representations as photographs. Moreover, works of art, by their very nature, might be expected by a viewer to have some originality, and not to be a simple copy of reality (see Leder et al., 2004). Works of art may also be expected to have a higher level of ambiguity (see Jakesch & Leder, 2009), which may influence the evaluations given by viewers and the similarity across raters. We therefore tested whether higher cross-observer similarity would be shown for representational works of art compared to abstract works of art. A further methodological difference was the collection of ratings rather than forced choice preferences. We were interested in gaining a measure of art evaluation that was not comparative in relation to other images, but, rather, independent for each image, and related to a graded scale rather than a binary judgment. Finally, our study was self-paced, with participants setting their own viewing time per image, as opposed to the second per image used in Vessel and Rubin. We felt one second was too fast for artworks, as Smith and Smith (2001) observed that the mean viewing time per artwork in a gallery was 27 seconds (median 17 seconds). Based on Vessel and Rubin's (2010) work, it was predicted that the ratings for "liking", for representational works of art would be more similar across individuals than ratings for abstract works of art.

Experiment 1

Method

Participants

Twenty students from the University of Chester participated in the study, which received ethical approval from the Ethics Committee of the Department of Psychology, University of Chester, and complied with British Psychological Society ethical guidelines.

Materials

Digital images of non-famous artworks found in a variety of locations on the internet (located via Google image search) were gathered by the authors. We chose non-famous artworks to reduce the probability that observers knew the work and had already formed an opinion about the work, or had been exposed to others' opinions of the work. Twenty abstract and twenty representational artworks were chosen. A sample of artworks can be seen in Figure 1, and a detailed list of the artworks can be found in the Supplementary Information. We classed artworks as representational if they resembled the ordinary shapes and colors of the entities represented, thus excluding artworks in which shapes were grossly distorted, or in which colors were unusual for the objects depicted, as, for example in representational expressionist artworks, which might feature content such as blue horses. The abstract artworks contained no recognizable objects, but could include shapes. We selected the forty artworks from an initially longer list on the basis of the consensus that the artworks reflected a range of attractiveness and colorfulness, and that the overall set contained a variety of topics, forms and styles. Note that consensus was established via independent completion of selection sheets by authors AS, PR and JK, followed by collation of those responses and a detailed discussion.

[Please insert Figure 1 about here, see **FIGURE 1 CAPTION** below]

FIGURE 1 CAPTION

Figure 1: Sample abstract and representational artwork, reproduced with permission from the artists. Copyright remains with the artists named in the caption. Top row, left to right a) Tony Broadbent: In a Minute b) Pol Ledent: Abstract 882140 c) Fons Heijnsbroek: Open/Close d) Arie Koning: The Source. Bottom row, left to right e) Ian Sheldon: Peeling Wallpaper f) Jean Smith: Laughter #4 g) Mark Peterson: '55 Thunderbird h) Nancy Howe: Strange Night. Please note that, while aspect ratios have been maintained, the image sizes for the artworks have been scaled to fit this figure and do not reflect actual sizes.

The twenty representational artworks were placed in a random order, and the twenty abstract artworks were also placed in a random order, and booklets were created, featuring first the representational and then the abstract artworks. The same random order was used for all participants. In replication of Vessel and Rubin (2010), we did not counterbalance block order. The blocked presentation was chosen because mixed presentation had shown substantially lower convergence than blocked presentation in Vessel and Rubin's Experiment 2 in comparison to their Experiment 1.

Booklets were printed in color, with one artwork per white A4 page, centered horizontally. Below each artwork five questions were printed and below each question there was a rating scale, with two anchor words (most negative on the left, most positive on the right) and between the anchors were the digits 1 – 7. The questions were "On a scale of 1 to 7 please rate how much you **like** the picture" (anchors "dislike", "like"), "On a scale of 1 to 7 please rate how **negative/positive** you find the picture" (anchors "negative", positive"), "On a scale of 1 to 7 please rate how **interesting** you find the picture (anchors "uninteresting", "interesting"), "On a scale of 1 to 7 please rate how **attractive** you find the picture" (anchors "unattractive", "attractive"), "On a scale of 1 to 7 please rate how **colorful** you find the picture (anchors: "not colorful", "colorful").

Procedure

Participants were tested individually at a desk in a quiet place. Following participant information and written consent procedures, participants were asked to provide ratings of the artworks along the dimensions stated. We asked participants to rate each picture independently, not comparing it to other pictures in the set, as we wanted to maximize the likelihood that that we would obtain independent ratings for each artwork. We did not set any time limits, but, indicatively, told participants that their participation would take a maximum of thirty minutes, but that for most people the duration would probably be shorter (cf. Smith & Smith, 2001). After having received the instructions, participants worked their way through the booklet in a sequential order, circling their response to each of the five questions for each of the forty artworks until the booklet was fully completed.

Results and Discussion

Data sets for two participants had to be discarded, because of missing data. The remaining 18 participants provided full data sets which were used in the analysis.

Our main point of interest was the similarity of the ratings across participants. To test this, we first needed a measure that captured the interrelatedness of the rater's responses to the artworks. For this purpose, we calculated the pairwise correlations between all raters, following Vessel and Rubin (2010). In our case, the correlations were based on ordinal scales, so we computed Spearman's rank correlation coefficients. We did this separately for abstract and representational artworks, and for each rating measure taken. In the second part of the analysis, also following Vessel and Rubin (2010), we compared all pairwise Spearman's correlation coefficients with a test for differences. In our case, the appropriate

test for differences was pairwise (because each inter-rater correlation coefficient from the abstract artworks had a counterpart in the representational artwork). Distribution testing using a series of Shapiro-Wilk tests showed non-normal distributions in at least one member of each of the five of these pairs, so the test of difference chosen was a non-parametric Wilcoxon signed rank test, for which we report Z and p in Table 1, alongside the mean Spearman's rank correlation coefficients, and the corresponding SEMs.

	Representational		Abstract		Wilcoxon	
	Mean rho	SEM	Mean rho	SEM	*Z*	*p*
attractiveness	.382	.020	.172	.023	-6.967	< .001
colorfulness	.498	.016	.553	.014	-3.116	.002
interest	.167	.021	.167	.019	-.052	.959
liking	.325	.020	.106	.020	-7.554	<.001
negativity/positivity	.537	.014	.393	.019	-6.584	< .001

Table 1: Mean of all pairwise Spearman rank correlation coefficients and SEMs for abstract and representational artworks in Experiment 1, with *Z* and *p* values for their pairwise differences using a Wilcoxon signed rank test, with N = 153.

The ratings for attractiveness, liking and negativity / positivity were significantly more similar across individuals for the representational than for the abstract items. Interestingly the ratings for colorfulness showed a difference in the opposite direction, as ratings were significantly more similar across participants for abstract than representational artworks. The level of inter-rater similarity for interest did not differ across the two types of artwork.

We ran an additional analysis, which had the purpose of examining whether participants' opinions of abstract works of art differed from those of representational works of art, in replication of prior work (e.g. Gordon, 1952; Landau, et al 2006; Augustin & Leder, 2006; Leder et al. 2012). The main purpose of this was to examine if our data replicated this well-documented effect, by way of calibration. Five paired-samples t-tests were run, in which the mean by-subject rating across twenty artworks for each category formed the dependent variable, and art type (representational, abstract) the independent variable. Means, *SDs t*, and *p*-values are presented in Table 2. For all measures, abstract art was rated significantly lower than representational art, replicating previous work.

	representational		abstract			
	mean	SEM	mean	SEM	t(17)	p
attractiveness	4.13	.16	2.98	.21	6.70	< .001
colorfulness	4.24	.12	3.68	.15	3.75	.002
interest	3.96	.14	3.12	.21	5.06	< .001
liking	4.49	.13	3.13	.22	5.85	< .001
negativity/positivity	4.70	.09	3.43	.12	11.04	< .001

Table 2: Means and SEMs for ratings of representational and abstract images in Experiment 1, with *t* and *p* values for the contrast in the final columns.

Our primary finding of Experiment 1 extends Vessel and Rubin's (2010) finding that viewer evaluations of representational images converge more than those of abstract images, at least on measures of taste (liking, attractiveness) and global valence (negativity / positivity). This generalizes their original finding, which used photorealistic images, to artworks. It also shows that the finding is robust under a different methodology. However, our finding does not address a key issue, which was also not directly addressed in Vessel and Rubin's work.

This concerns the claim that the valence generated by the semantic associations is a key component of the process by which the convergent and divergent views arise in response to representational and abstract artworks, respectively (see Vessel & Rubin, e.g. p. 10). Experiment 2 aims to address this. Experiment 2 also remedies the lack of counterbalancing of block order that somewhat affects the interpretation of Experiment 1.

It is interesting to note that for colorfulness the difference was significant in the opposite direction, i.e. it showed greater convergence for abstract than representational artworks, which could indicate that raters pay more attention to color in abstract artwork than in representational artwork. This was not the main focus of our research, so it is not pursued in Experiment 2, but we will return to this briefly in the Discussion.

Experiment 2

Vessel and Rubin emphasize that finding meaning in an image can lead to an increased cross-observer similarity in preferences for realistic images in comparison to abstract images. They claim that this can be due to shared negative associations leading to shared low levels of liking and shared positive associations leading to shared high levels of liking. Although Vessel and Rubin's work is highly persuasive in showing that the presence of meaning in a representational image leads to higher levels of similarity in preferences across observers than is the case for less meaningful abstract images, they did not directly measure the valence of the associations generated by an image, nor whether these associations also showed high levels of similarity across observers.

In this experiment, we further examined the proposal that the valence of semantic associations for artworks diverge for abstract art and converge for representational art. As a work of art can have multiple associations, each of which may vary in valence, our method of

measuring association valence had to reflect this. We therefore adapted the Unique Corporate Association Valence (UCAV) measure, which was developed by Spears, Brown, and Dacin (2006) to quantify the valence of the associations elicited by consumer brands. The original UCAV involves people writing down brief descriptions that come to mind when presented with a brand and then self-rating the valence of their description on a three point scale. Averaging the scores of the descriptions gives an overall measure of the valence of the combined associations elicited by a brand. By asking participants to write down their own unique associations and score their valence, the UCAV is able to capture the subjective aspect of the elicited association, while enabling a quantitative measure of the valence of each association, and the valence of all those associations combined. In their study Spears et al. found that the valence of associations elicited by specific brands, as measured by the UCAV, significantly correlated with the overall evaluation of a brand ($r = .71$). They concluded that associations were a powerful factor in determining brand liking and that the UCAV was able to reliably measure the valence of brand associations.

To examine the proposal that convergence in tastes in artworks is stronger for representational than abstract art due to shared associations, we asked participants to complete an adapted UCAV in response to a series of abstract and representational artworks. We also gathered participants' responses via rating scales. The main aim of this study was to examine whether there was greater convergence for representational artworks than for abstract artworks on the UCAV scores. The rating scales served to provide further calibration.

Method

Participants

Twenty four adults (mean age: 30.5 years, SD = 15.29, range = 19-63 years) participated in the study (9 males, 15 females). One further participant was tested, but yielded an incomplete dataset, and was replaced. The participants were recruited via opportunity sampling with the majority of participants being undergraduate students from the University of Chester. None of the participants had participated in Experiment 1. Ethical approval for this research was given by the University of Chester Psychology Department Ethics Committee and the research complied with the ethical code of conduct of the British Psychological Society.

Materials

Twenty two images of artworks were selected for the experiment. Half were representational and half were abstract, using the same definitions as for Experiment 1. Again, all images were by non-famous artists and were obtained from online databases, with the representational artworks depicting a range of different scenes and the abstract art using a range of styles. The image set overlapped in part with that used in Experiment 1, but contained some artworks not used in Experiment 1, because they were chosen as part of a separate, independent project. The images were printed on A4 paper, without any text. Details of the images used can be found in the Supplementary Information.

Response booklets containing UCAV materials, adapted from Spears, et al. (2006), and containing ratings scales were prepared, with one sheet of each for each of the artworks and a separate sheet for each type of rating. UCAV sheets in these booklets provided five to-be-completed rectangular text boxes occupying the left-hand side of the sheet, with the UCAV

scoring symbols presented to the right of each box. As stated before, the original UCAV used a three point scale (+ 0 -) to rate associations. We increased this to a five point scale, - -, -, 0, +, and ++ (translated into 1 – 5, respectively at scoring) to increase the sensitivity, with the aim of measuring a greater range of association valence values. Separate rating scale sheets presented 7-point scales measuring four ratings: Liking (1 = dislike, 7 = like), Positivity (1 = negative, 7 = very positive), Interest (1 = uninteresting, 7 = very interesting) and Attractiveness (1 = unattractive, 7 = very attractive), with all numbers presented in a horizontal line, with anchors on either side. Note that the anchors vary somewhat from those in Experiment 1, potentially widening the scale somewhat, and do not contain the rating "colorful". The omission of colorfulness had the advantage that it did not risk creating a focus on color as an important dimension in participants' liking, as may potentially have been the case in Experiment 1.

Procedure

All participants were tested individually. Each participant viewed the 22 artworks (11 realistic and 11 abstract) and for each artwork they completed the four Likert rating scales (Liking, Positivity, Interest, Attractiveness) for all the artworks in one block, and the UCAV measure for all the artworks in a different block. Before completing the UCAV participants were given the following instructions: "please write a word or short description in the boxes below of any thoughts that the work of art brought to mind. Please try to complete a minimum of three boxes and then please circle how positive, neutral or negative the description is". To control for order effects, the order in which participants completed the rating scales and UCAV blocks was counterbalanced, as was the order in which they viewed blocks of representational and abstract artworks. Between completing the rating scales and UCAV all participants completed the 18-item Need for Cognition scale (NFC, Cacioppo, Petty & Kao, 1984). This was intended to be a control for participants' motivation to write text, but in the event, this measure showed no significant associations or differences in any statistics, so it

does not feature in the results. The completion of the whole study took approximately 40 minutes.

Results

UCAV scores were calculated for each participant's rating of each artwork by averaging the participant's score given to all associations for that artwork. We also counted the number of words written by each person in response to each artwork. Rating values given to all other scales were also entered as data.

We conducted the same similarity analysis as for Experiment 1, but, for this analysis only, one participant's data had to be excluded, because this participant had responded without any variance to the abstract artworks (giving uniform ratings of 1), which prevented the set of correlation coefficients between that participant and the other participants from being computed. For one further participant, one missing datapoint was estimated using the mean for that condition. Pairwise Spearman's rank correlation coefficients were computed, and compared, once again, with Wilcoxon's signed rank tests, due to non-normality of the distributions.

One focal analysis concerned a replication of the pattern observed in Experiment 1 in relation to the "liking" scores, which had shown significantly stronger similarity for representational than abstract work. This pattern was replicated in the current study, with a significantly higher mean Spearman's rank correlation coefficient for representational than abstract artworks on this rating, replicating the findings of Experiment 1, with a new set of participants, and a slightly different (and smaller) set of artworks (see Table 3). The other rating measures showed a similar pattern, with the exception of "interest", which showed a numerically, but not significantly, larger mean Spearman's rank correlation coefficient for abstract than representational artworks.

Table 3:

	Representational		Abstract		Wilcoxon	
	Mean rho	SEM	Mean rho	SEM	Z	p
Attractiveness	.405	.017	.068	.020	-10.197	< .001
Interest	.039	.022	.077	.019	-1.340	.180
Liking	.212	.020	.015	.020	-6.550	< .001
Positivity	.440	.020	.176	.023	-9.499	< .001
UCAV	.286	.020	.032	.023	-8.417	< .001

Table 3: Mean of all pairwise Spearman rank correlation coefficients and SEMs for abstract and representational images in Experiment 2, with *Z* and *p* values for their pairwise differences using a Wilcoxon signed rank test, with N = 253.

The key extension to Experiment 1 was the inclusion of the UCAV scores. Convergence of these was significantly higher for representational than abstract artworks (see Table 3), which, for the first time, provides evidence that the valence of associations converges to a greater extent in response to representational than in response to abstract artworks.

Finally, the mean rho values in Experiment 2 were lower than in Experiment 1. The likeliest reason for this is that the rho values in this experiment were based on 11 items, while in Experiment 1 they were based on 20 items. However, the difference between the correlation coefficients remains robust, showing that the effect replicates under different sample size parameters for both items and raters.

In addition to testing our primary hypothesis, we ran a calibrating analysis to check whether, as in Experiment 1, representational artworks were given more favorable evaluations overall, and, additionally, whether they attracted a larger number of words in response. The results of these analyses are in Table 4, which shows that, for all rating measures except attractiveness, the mean rating for representational artworks was significantly higher than that for abstract artworks. This replicates our findings from Experiment 1, as well as patterns in the literature. The UCAV scores did not differ significantly (though note that the means differed in the same direction as the rating scales, and the difference approached significance). The number of words produced in response to representational artworks was significantly higher than the number elicited by abstract artworks. This is likely to be a reflection of the fact that meaning is more readily available in the representational artworks.

	Representational		Abstract		Difference	
	Mean	SEM	Mean	SEM	t(23)	p
Liking	4.23	.16	3.61	.27	2.18	.04
Positivity	4.24	.13	3.64	.21	2.63	.01
Interest	4.16	.18	3.51	.26	2.32	.03
Attractiveness	4.12	.16	3.59	.26	1.82	.08
UCAV	3.31	.07	3.07	.13	1.81	.08
Number of words	6.61	1.03	5.33	.83	3.20	.004

Table 4: Means and SEMs for representational and abstract images in Experiment 2, with *t* and *p* values for the contrast in the final columns.

We ran a further exploratory test, to examine the idea that associations may be a greater driver of liking in representational than in abstract art. To test this we checked whether the UCAV scores correlated significantly more strongly with liking in representational artworks

than abstract artworks, examining this by items. Using Spearman's rho, the UCAV scores correlated strongly and significantly with liking ratings for abstract artworks, rho = .612, N = 11, p = .023 (one-tailed), while the two measures correlated very strongly and significantly for representational artworks, rho = .918, N = 11, p < .001 (one-tailed), with the correlation coefficients differing significantly from each other using a Fisher Z transformation (see Myers & Sirois, 2004), Z = -1.73, p = 0.04, (one-tailed). This finding suggests that associations drive liking to a greater extent in representational than in abstract work.

Finally, we ran a control analysis to examine whether the UCAV scores correlated with the number of words used in the UCAV task. This was to check whether the quantity and quality of the associative material elicited correlated. In neither the abstract (rho = .45, N = 11, p = .447) nor the representational artworks (rho = .219, N = 11, p = .259) was this the case. The two measures did not differ from each other, Z = -0.36, p = 0.7188 (two-tailed). This suggests that, while representational artworks elicited a higher quantity of verbal response material, the quantity of verbal responses did not show any relationship with the valence of the associations elicited. Importantly, this lack of association between quantity and valence did not appear to differ for representational and abstract artworks. Thus, the number of words does not appear to be linked to the valence of the associations, and therefore the valence of the association appears independent of the quantity.

Discussion

We tested whether liking for representational art converges across participants to a larger extent than liking for abstract art, and both our experiments showed this to be the case, with significant differences in convergence demonstrated twice, with different participants and partly differing sets of artworks. These findings replicate Vessel and Rubin's (2010) work, using a different methodology. This finding in itself strengthens their claims.

In addition, our data from Experiment 2 showed that, when viewer associations were elicited, and when these associations and responses were rated by the viewers for valence, the valence converged across viewers to a significantly larger extent for representational artworks than for abstract artworks. This extends Vessel and Rubin's (2010) work significantly. On the basis of their own findings, Vessel and Rubin had proposed that the internal states of multiple viewers are more similar due to the shared meaning inherent in realistic images. However, they inferred this from the levels of convergence observed in their data without probing the inferred internal processes directly. Our finding provides evidence about the internal processes that might lead to convergence. As shown, our viewers generated a series of verbal responses, which externalized their reactions to the artworks, and then rated the valence of their self-generated responses. These ratings did indeed converge to a larger extent for representational artworks than abstract artworks. While our evidence does not show that the precise content of the meaning is shared across participants, it does show that the valence attributed to that content is shared across different viewers. Thus, while Vessel and Rubin hypothesize that shared semantic content is at the root of the convergence difference, our work provides more specific evidence to support this hypothesis. It is possible to pursue this issue even further in the future by devising a method which can measure the semantic overlap between the responses different viewers generate, but this is beyond the scope of the current research.

We ran a number of calibrating analyses for Experiment 2. In the first, we wanted to compare our findings against the original UCAV. In the original UCAV, Spears et al. (2006) found that the liking for a brand correlated strongly and significantly with the UCAV scores generated by the brand. Our work calibrates well with this finding, as in both abstract and realistic artworks, the UCAV score correlated significantly with the liking ratings. Interestingly, we also found that the correlation between UCAV scores and liking ratings was significantly stronger for the representational art than for the abstract art, which provides a

separate source of evidence to suggest that meaning and associations drive the appreciation of representational art more than the appreciation of abstract art. The observation in Experiment 1 that inter-rater similarity was higher for colorfulness in abstract than representational artwork may also be suggestive of the converse. It is possible that color, rather than meaning, might determine the response to artworks to a greater extent for abstract than representational art, although this evidence is not conclusive. Nevertheless, the combined observations raise the possibility that the appreciation of abstract art may be more driven by visual properties of the artworks, but this specific issue needs to be probed more deeply in future research, as our current research does not provide further direct evidence on this.

In an additional calibration, both Experiment 1 and 2 found that participants liked realistic artworks more than abstract artworks. This replicates previous research, and because of the use of unfamiliar works of art rather than artworks by famous artists (e.g. Landau et al., 2006; Augustin & Leder, 2006; Leder et al. 2012), our results strengthen the finding that naïve viewers evaluate representational art more favorably than abstract art. This was not the main focus of the current research, but it is of note that this relatively robust finding was replicated in our research, as it provides evidence that our work calibrates well with prior work in this respect. This, in turn, suggests that our artworks and participants were not systematically different from those used in previous research, providing some confidence that our findings can be generalized beyond the current sets of raters and artworks.

A reservation that we need to express regarding our work is that we asked observers to generate external responses to artworks so that these could be rated. While these responses were readily provided, and subsequently readily rated, we cannot be sure that the UCAV method reflects the internal process by which observers would ordinarily respond to artworks, or whether, instead, our method distorts the process of viewing art, so that it no longer represents it. It is our view that, although this reservation exists in theory, given the

readiness with which the task was completed, it is likely that our method simply externalized spontaneously and naturally occurring processes, rather than forcing these unnaturally. It is possible that this specific question could be further probed in future research.

Conclusion

We found that observer ratings for representational artworks converge to a greater extent than those for abstract artworks. Our work also confirms that this convergence in aesthetic appreciation is linked to the generation of semantic associations whose valence converges more in response to representational than abstract art. Further, the findings show that semantic associations play an important role in observer responses to representational artworks, but may play a lesser role in the evaluation of abstract artworks. Finally our work suggests a number of specific questions for future research. In particular, we believe it would be interesting to examine whether the content of the associations generated by abstract and representational artworks overlap to differing degrees.

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