TASTE SENSITIVITY AND AESTHETIC PREFERENCES: IS TASTE ONLY A METAPHOR?

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ABSTRACT

“Taste” is often used to describe sensitivity to both foods and visual art. We examined whether a biological marker of physical taste sensitivity influenced aesthetic preferences. In three studies, we measured physical taste sensitivity by exposing participants to the chemical phenylthiocarbamide (PTC) and having them rate how bitter it tasted (if they tasted it at all). Across all studies, miscalibrated physical taste sensitivity (extremely high and low taste bud density) related to extreme negative responses to disturbing and provocative artwork. Miscalibrated physical taste sensitivity was related specifically to avoiding (high disgust) disturbing artwork, but not to approach-related negative affect (anger). These findings provide novel evidence regarding biological influences on aesthetic preferences.

“Taste. You cannot buy such a rare and wonderful thing. You can’t send away for it in a catalogue. And I’m afraid it’s becoming obsolete.”
(Rosalind Russell)
What do people mean when they say that a person has extreme “taste” for visual art? Is taste only a metaphor? Or, instead, is there a link between physiological taste sensitivity and taste for artwork? The current work examined whether a genetic marker of physical taste sensitivity had implications for aesthetic preferences of visual art. Specifically, we tested the hypothesis that miscalibrated physical taste sensitivity, as indicated by extremely low or high density of taste receptors on the anterior tongue, would relate to extreme aesthetic preferences for artwork.

**WHAT IS TASTE?**

People frequently use the word “taste” to describe individual differences in aesthetic preferences and evaluations. Much of this work has focused on how experts and novices differ in their evaluations of art. For the most part, experts prefer art that is complex, abstract, visually asymmetrical, and aesthetically important (Axelsson, 2007; Kozbelt, 2006; Locher, Smith, & Smith, 2001; McWhinnie, 1968; Parsons, 1987). Novices prefer art that is simple, familiar, representational, and easy to process (see Reber, Schwartz, & Winkielman, 2004, for a review). Some consider aesthetic taste as a marker of socioeconomic status. According to this perspective, members of the elite social class have high levels of taste, whereas members of the proletariat have low levels of taste (Bourdieu, 1984; Holbrook, Weiss, & Habich, 2004; Kraaykamp, 2002).

What other factors may influence taste for artwork? Psychological aesthetics has become increasingly interested in biological contributions to aesthetic experience (e.g., Skov & Vartanian, 2009), yet to date there is still not much work on biological markers of taste for artwork. The current work sought to fill this gap in the literature by examining how physical taste sensitivity influences evaluations of art.

**Defining and Measuring Physical Taste Sensitivity**

Physical taste sensitivity refers to the extremity of responsiveness to various substances (Drewnowski, Henderson, Shore, & Barratt-Fornell, 1997; Kalmus, 1958). Typically, researchers measure taste sensitivity by exposing people to substances that only certain people can taste and measuring the degree to which their reaction to the substances is extreme. One widely used method, employed in our research, involves people tasting a piece of paper treated with the chemical phenylthiocarbamide (PTC; see Bartoshuk, Duffy, & Miller, 1994, for a review). After tasting the PTC paper, people indicate whether they can detect a taste for the chemical and, if so, they rate the bitterness of the taste. Using this method, which corresponds to studies in which actual taste bud density is measured (Tepper & Nurse, 1997), researchers group people into three categories according
to their taste sensitivity (Bartoshuk, 2000; Bartoshuk et al., 1994; Joiner & Perez, 2004; Tepper & Nurse, 1997). Some people react strongly to PTC due to a high density of taste buds. These supertasters, as they are frequently called, have high density of taste receptors on the anterior tongue (fungiform papillae, taste buds). People in the second group—commonly referred to as tasters—have intermediate taste bud density and rate PTC as only mildly bitter. A third group consists of people who have low taste bud density and are “blind” to the bitter taste of PTC that tasters and (especially) supertasters evaluate as negative. People in this group are called non-tasters, since they tend not to taste substances that other people easily taste. We used this valid and established method for placing people into groups—supertasters, tasters, and non-tasters—according to their sensitivity to PTC.

**Taste as Physical and Mental**

Can physical taste sensitivity influence outcomes other than sensitivity to substances? The neurobiology underlying taste sensitivity involves many different neural pathways operating simultaneously, resulting in taste sensitivity affecting several seemingly unrelated outcomes. Some research, for example, has shown that PTC sensitivity can be used as a genetic marker for various disorders seemingly unrelated to taste sensitivity. For example, non-tasters, compared to supertasters and tasters, have a higher probability of having a DSM-IV diagnosis of schizophrenia (Moberg, McGue, Kanes, Roalf, Balderston, Gur, et al., 2007) and Parkinson’s disease (Moberg, Balderston, Rick, Roalf, Weintraub, Kleiner-Fisman, et al., 2007). PTC sensitivity also relates to vulnerability for depression and alcoholism. Supertasters, compared to non-tasters and tasters, have a lower percentage of first-order relatives with major depressive disorder (Joiner & Perez, 2004). And supertasters exhibit lower signs of alcohol use problems than do both non-tasters and tasters (Driscoll, Perez, Cukrowicz, Butler, & Joiner, 2006). These findings suggest that individual differences in taste sensitivity influence outcomes other than those directly related to sense of taste.

**Taste Sensitivity and Evaluations of Artwork: The Miscalibration Hypothesis**

How might physical taste sensitivity influence aesthetic preferences? We propose that the effect of physical taste sensitivity on art preferences depends on whether people deviate from the standard level of physical taste sensitivity; that is, if they are miscalibrated. Most people are tasters (Joiner & Perez, 2004; see Studies 1-3 below), thereby making non-tasters and supertasters non-standard from average levels of taste sensitivity. Therefore, people who have miscalibrated physical taste sensitivity, such as having extremely low (non-tasters) or high (supertasters) levels, should have especially extreme reactions to artwork. This miscalibration hypothesis, therefore, predicts a curvilinear relationship between
physical taste sensitivity and art preferences, with non-tasters and supertasters having the most extreme art preferences.

Although psychology is typically interested in typical levels of traits, the notion of miscalibrated individual difference traits has been used to predict extreme responses in various areas of psychology. Of particular relevance to the current investigation, a large body of research has investigated the effects of miscalibrated emotional sensitivity on various outcomes. When predicting extreme aggressive outbursts, for example, people who are extremely emotionally insensitive (e.g., people high in psychopathy) or are extremely emotionally sensitive (e.g., people high in neuroticism) tend to behave the most aggressively (Hare, 2003; Hellmuth & McNulty, 2008). Similar findings have emerged from the attachment literature (Mikulincer & Shaver, 2007). People with extremely low (i.e., those with an avoidant attachment style) and extremely high (i.e., those with an anxious attachment style) levels of need for closeness with others are most likely to lash out at intimate relationship partners (see Finkel & Slotter, 2007, for a review), whereas people who feel secure in their need for closeness with others—the most common attachment style (Hazan & Shaver, 1987; Vohs, Baumeister, & Ciarocco, 2005) that is marked by intermediate levels of avoidance and anxiety (Bartholomew & Horowitz, 1991)—show intermediate levels of lashing out at intimate partners.

The implication is that individual differences, including physical taste sensitivity, are best understood in relation to a standard or average level, and deviations from that standard in some cases relate to extreme responses. Thus, there is theoretical and empirical precedent for the miscalibration hypothesis as it relates to negative reactions to visual artwork. Non-tasters and supertasters should have the most extreme reactions to artwork, whereas tasters should show art preferences that fall in between those two groups.

A contrasting possibility is that physical taste sensitivity will have a positive linear relationship to extremity of art preferences. This linear sensitivity hypothesis predicts that supertasters, compared to tasters and non-tasters, will have extreme evaluations of artwork. Taste sensitivity will thus correlate positively with pleasing works of art and will correlate negatively with disturbing works of art: supertasters will have the most positive evaluations of pleasing artwork and the most negative evaluations of disturbing artwork.

**The Present Research**

In three studies, we tested competing hypotheses—the miscalibration hypothesis and the linear sensitivity hypothesis—by having people complete a measure of physical taste sensitivity and then evaluate various types of artwork (pleasing, disturbing, or neutral). We predicted that people with miscalibrated physical taste sensitivity, as indicated by extremely low or high density of taste receptors on the anterior tongue, would have the most extreme art preferences.
In addition, we expected that physical taste sensitivity would influence evaluations of disturbing artwork more so than positive and neutral artwork. Negatively valenced stimuli have a stronger impact on evaluations than do positive stimuli (Baumeister, Bratslavsky, Finkenauer, & Vohs, 2001). When asked to evaluate a person, for example, negative traits about the person carry more weight than do positive traits (Fiske, 1980; Hodges, 1974; Vonk, 1993). Therefore, any effect of physical taste sensitivity on evaluations of artwork should be strongest for negative or disturbing art compared to positive and neutral art.

We also expected that the effect of physical taste sensitivity on aesthetic preferences would have the strongest impact among people with relatively little expertise in artwork, presumably because people with low expertise have little formal knowledge on which to base their judgments (Parsons, 1987; Smith & Smith, 2006). Because experts in the arts have extensive formal knowledge of the arts, their judgments are probably more strongly affected by their training and domain knowledge than by low-level sensory processes related to taste sensitivity.

**STUDY 1**

**Method**

*Participants*

One hundred thirty-six undergraduates participated in exchange for extra credit toward a psychology course. Following previous procedures (Joiner & Perez, 2004), participants refrained from smoking, eating, or drinking for 1 hour prior to participating.

*Materials and Procedure*

Participants completed the study in a large classroom. After giving informed consent, participants completed a trait curiosity scale (Kashdan, Rose, & Fincham, 2004) and a brief demographic questionnaire. Participants then viewed 44 images depicting four types of artwork: disturbing images (e.g., *Head Surrounded by Sides of Beef* by Francis Bacon and *Echo of a Scream* by David Alfaro Siqueiros), homoerotic male nudes (e.g., *Thomas and Ken Moody* by Robert Mapplethorpe), black-and-white abstract images (e.g., untitled works by Gustav Morin, Spencer Selby, and Andrew Topel), and conventional images with no strong emotional tug (e.g., *Element 2* and *Element 10* by Maria Friberg). Most of these images have been used in past research on aesthetic responses to photography, visual poetry, and paintings (e.g., Cooper & Silvia, 2009; Silvia, 2005a, 2005b, 2010; Silvia & Brown, 2007; Turner & Silvia, 2006). Each image was displayed for 5 seconds, during which participants provided their evaluation of the image from 1 (extremely dislike) to 7 (extremely like).
After providing ratings of the images, participants completed the positive and negative affect schedule (PANAS; Watson, Clark, & Tellegen, 1988). Participants were then given an envelope containing a 3.80 × 1.43 cm piece of paper treated with phenylthiocarbamide (PTC; Carolina Biological Supply Company, Burlington, NC). The experimenter instructed participants to moisten their tongue with saliva and then to place the piece of paper in the middle of their tongue for as long as it took to make an evaluation of any taste that was detected. Participants placed the used PTC paper in the envelope and rated the intensity of the bitterness of the paper from 0 (no taste at all) to 9 (among the most bitter things I have ever tasted). This approach to assessing taste sensitivity has been used in several previous studies (e.g., Frank & Korchmar, 1985; Joiner & Perez, 2004).

Results and Discussion

Did miscalibrated physical taste sensitivity predict extreme aesthetic preferences? Taste sensitivity can be analyzed two ways: as a continuous variable ranging from 0 to 9, or as an ordered-categorical variable consisting of non-tasters (n = 35; score of 0), tasters (n = 61; scores of 1-6), and supertasters (n = 40; scores of 7-9). We report analyses of the continuous variable; for convenience and continuity with other research, the tables and figures display the effects according to three groups. Aesthetic preference scores were averaged within each category of images (disturbing, homoerotic, black-and-white abstract, and conventional).

We conducted a multivariate regression model with taste sensitivity’s linear and quadratic effects as the main predictors of interest and four simultaneous outcomes (preferences for disturbing, homoerotic, black-and-white, and conventional images). A multivariate model simplifies the treatment of “picture type” (a nominal, unordered variable with four levels) and protects against the inflated Type 1 error that would otherwise result from a series of univariate models. Trait curiosity, positive affect (PA), negative affect (NA), and gender were included as covariates. The analyses were conducted with Mplus 5.21, using maximum likelihood with robust standard errors.

For disturbing pictures, taste sensitivity had a nonsignificant linear effect (β = −.027, p = .74) but a significant quadratic effect (β = −.226, p = .007). Other significant linear effects appeared for trait curiosity (β = .218, p = .011) and PA (β = .245, p = .002). For homoerotic pictures, taste sensitivity had a nonsignificant linear effect (β = .048, p = .57) but a significant quadratic effect (β = −.229, p = .005). Other significant effects appeared for trait curiosity (β = .356, p < .001) and NA (β = −.116, p = .071).

For black-and-white images and conventional images, taste sensitivity had neither linear (black-and-white: β = .097, p = .251; conventional: β = −.034, p = .696) nor quadratic (black-and-white: β = −.049, p = .583; conventional: β = −.042, p = .616) effects. The only significant effect was for PA, which predicted higher preference for both picture types (black-and-white: β = .348, p < .001; conventional: β = .254, p = .002).
Figure 1 displays the pattern of means broken down by supertaster group; Table 1 reports the descriptive statistics. The figure depicts the central findings from the regression model: relative to tasters, non-tasters and supertasters preferred the disturbing and homoerotic images less.

These findings support the miscalibration hypothesis and disconfirm the linear sensitivity hypothesis. People with extreme levels of taste sensitivity—low and high—made extreme evaluations of artwork. The results were unique to provocative artwork, which lends support for the prediction that the effect of taste sensitivity on artwork evaluations would be strongest for negatively valenced stimuli.

**STUDY 2**

Study 2 was conducted to replicate and extend the results supporting the miscalibration hypothesis, using different artwork to provide converging evidence.
and more precise dependent measures. Because the effects of Study 1 were found only for negatively valenced artwork, Study 2 used only negatively valenced stimuli to explore this finding in more detail (thereby enabling us to replicate the Study 1 results). Null results are inherently ambiguous, making it unnecessary to include positively valenced images as a means of testing our hypothesis. Moreover, Study 2 measured a wider range of emotions, given that simple liking is only one of many feelings that people experience in relation to the arts (Silvia, 2009, in press). Instead of assessing simple liking, Study 2 included multi-item measures of interest, anger, disgust, confusion, and pleasingness. Of these, disgust and pleasingness are the emotions most related to physical taste: they relate closely to the “approach and avoid” and “accept versus reject” dimensions of affect.

If the effects of Study 1 were due to supertasters and non-tasters wanting to avoid the provocative artwork, then these participants should report high levels of disgust in response to disturbing artwork. It is also possible that supertasters and non-tasters will express low levels of pleasingness. We did not expect effects for interest and confusion, two knowledge emotions that are more strongly predicted by novelty and comprehensibility than by valence (Silvia, 2010; Turner & Silvia, 2006), or for anger, an approach-oriented negative emotion. Nevertheless, including a wide range of emotions allowed us to test whether taste sensitivity had specific or diffuse effects on aesthetic responses.

**Method**

**Participants**

One hundred nineteen undergraduates participated in this study. As in Study 1, participants refrained from smoking, eating, or drinking for 1 hour prior to participating. Due to a clerical error, participant gender was not collected.
Materials and Procedure

Participants arrived at a laboratory in groups of two to four for a study concerning the relationship between taste sensitivity and perceptions of artwork. Participants sat in individual cubicles and were presented with 12 images from Andres Serrano’s *The Morgue* series. Each image depicts a corpse that was photographed in a New York City morgue; the image’s title describes the cause of the person’s death (e.g., “Death by Drowning,” “Knifed to Death”). For each image, participants gave ratings of interest, anger, disgust, confusion, and pleasingness. Ratings were made on a scale that ranged from 1 (*not at all*) to 7 (*extremely*). After rating all 12 images, participants completed the PANAS and a 50-item measure of the Big Five factors taken from the International Personality Item Pool (Goldberg, Johnson, Eber, Hogan, Ashton, Cloninger et al., 2006). Participants then completed the taste sensitivity test using the same method as in Study 1, after which they were debriefed, given their compensation, and dismissed.

Results and Discussion

As before, we conducted a multivariate regression model in which ratings of the five emotions (pleasingness, disgust, anger, interest, and confusion) were modeled as simultaneous outcomes, and taste sensitivity was included as a continuous variable. The Big Five factors were included as covariates. As before, the analyses were conducted with Mplus 5.21 using maximum likelihood with robust standard errors. Figure 2 displays the pattern of effects broken down by groups of non-tasters (*n = 31*), tasters (*n = 61*), and supertasters (*n = 27*); Table 2 reports the descriptive statistics.

As expected, and consistent with the miscalibration hypothesis, we found significant quadratic effects for disgust and pleasingness, the emotions most strongly connected to approach and avoidance. For disgust, taste sensitivity had a nonsignificant linear effect (*β = .047, p = .49*) but a significant quadratic effect (*β = .135, p = .049*). For pleasingness, taste sensitivity again had a nonsignificant linear effect (*β = -.042, p = .48*) but a significant quadratic effect (*β = -.121, p = .026*). Taste sensitivity had no significant linear or quadratic effects for ratings of anger, interest, and confusion (*β*s ranged from .015 to .09).

Although included as control variables, the Big Five factors had interesting effects in their own right. Consistent with much past work, Openness to Experience predicted greater levels of interest (*β = .166, p = .025*). Neuroticism predicted

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1 Although we measured PA and NA as well, we opted to include the Big Five factors and omit PA and NA as covariates. PA and NA overlap strongly with Extraversion and Neuroticism (Watson, 2000), which complicates estimating the multivariate regression model. Given that Study 1 used PA and NA as covariates, including the Big Five in Study 2 was more informative. Using PA and NA here does not appreciably change the study’s main results.
stronger negative emotions to the works—particularly higher disgust ($\beta = .238$, $p < .001$) and anger ($\beta = .130$, $p = .024$) and lower pleasingness ($\beta = -.124$, $p = .017$)—consistent with the higher emotional reactivity typical of neuroticism.

These findings provide additional support for the miscalibration hypothesis that extreme taste sensitivity—low and high—has direct relations to extreme aesthetic judgments. Taste sensitivity scores predicted levels of disgust and pleasingness, the two emotions most closely related to an “approach and avoid” dimension of behavior and an “accept versus reject” dimension of affect. Extreme taste sensitivity—low or high—predicted high levels of disgust and low levels of pleasingness in response to disturbing artwork.

**STUDY 3**

Studies 1 and 2 provided consistent support for the miscalibration hypothesis by showing that extreme physical taste sensitivity related to more extreme judgments of disturbing and provocative artwork. In Study 3, we sought to replicate and
extend the first two studies by examining expertise in the arts as a moderator of the effect of taste sensitivity. A large body of work in empirical aesthetics shows that many variables affect the aesthetic experience of novices but not of experts (Augustine & Leder, 2006; Kozbelt, 2006). Novices tend to use tacit, intuitive experiences as a basis for their aesthetic judgments, whereas experts tend to use formal, crystallized knowledge of the arts (Parsons, 1987; Smith & Smith, 2006). Novices, for example, like visual art that contains their favorite colors. Experts, in contrast, report that the mere presence of certain colors (as opposed to their compositional use) is less important (Parsons, 1987). As a result, novices’ aesthetic judgments are influenced by a range of low-level features, such as an object’s angularity, color, and typicality (Silvia & Barona, 2009). We would thus expect taste sensitivity to have a larger effect for novices than for experts.

As in Study 2, we focused on disturbing and controversial images, but we expanded the set of images beyond a single series associated with a single artist. People viewed eight images, which had been used in past work on negative aesthetic emotions, and they rated the images for pleasingness and disgust, which emerged as central outcomes in the earlier studies. To rule out possible order effects, we also counterbalanced the order in which participants were exposed to the PTC paper.

Method

Participants

One hundred thirty-two undergraduates participated in this study.

Materials and Procedure

Participants arrived at a laboratory in groups of two to eight and sat at individual tables. The experimenters explained that the study was about people’s

<table>
<thead>
<tr>
<th>Preferences</th>
<th>Non-taster</th>
<th>Taster</th>
<th>Supertaster</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pleasant</td>
<td>2.25 (.72)</td>
<td>2.37 (.78)</td>
<td>1.91 (.71)</td>
</tr>
<tr>
<td>Disgusting</td>
<td>2.60 (1.31)</td>
<td>2.35 (1.17)</td>
<td>3.24 (1.48)</td>
</tr>
<tr>
<td>Angry</td>
<td>3.73 (1.40)</td>
<td>3.47 (1.26)</td>
<td>3.67 (1.41)</td>
</tr>
<tr>
<td>Interesting</td>
<td>3.77 (1.13)</td>
<td>4.04 (1.01)</td>
<td>4.05 (.97)</td>
</tr>
<tr>
<td>Confusing</td>
<td>3.69 (.94)</td>
<td>3.71 (.78)</td>
<td>3.55 (1.15)</td>
</tr>
</tbody>
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Note: Standard deviations appear in parentheses.
opinions about a broad range of images. The taste ratings were obtained via the same methods as in Studies 1 and 2. The set of images consisted of eight pictures that had been used in past work on negative aesthetic emotions (Cooper & Silvia, 2009; Silvia & Brown, 2007; Turner & Silvia, 2006), such as *Piss Christ* by Andres Serrano, *Death and Funeral of Cain* by David Alfaro Siqueiros, and *Saturn Devouring His Children* by Francisco Goya. People received a booklet with color reproductions of the images. After viewing each image for as long as they wished, people rated the image for disgust (“I find this picture disgusting”), pleasingness (“This picture is pleasant”), and anger (“This picture makes me angry”); as distracter items, we also obtained ratings of the images’ brightness and comprehensibility. All items were completed using 1 (not at all) to 7 (yes, definitely) scales. The order was counterbalanced: half of the participants viewed and rated the artwork first, and the other half gave the taste ratings first.

After completing the task and rating the images, participants completed the PANAS and a measure of expertise in the arts. Smith and Smith’s (2006) aesthetic fluency scale lists terms and figures from art history (e.g., Isamu Noguchi, Fauvism) and asks people how familiar each term or figure is to them, using a 0 to 4 scale (0 = I have never heard of this artist or term, 4 = I can talk intelligently about this artist or idea in art). Several studies have provided evidence for the validity of the scale as a measure of expertise in a range of samples and aesthetic contexts (Silvia, 2007; Silvia & Barona, 2009; Silvia & Berg, 2011; Silvia, Martin, & Nusbaum, 2009; Smith & Smith, 2006).

**Results and Discussion**

The aesthetic fluency scale had reliable scores (α = .85), so we averaged the items for an overall expertise score and then standardized this score. Our analyses examined whether taste sensitivity predicted aesthetic judgments, particularly if it interacted with expertise. We tested these hypotheses with a multivariate regression model that had three outcomes (ratings of pleasingness, disgust, and anger) and that included linear and quadratic contrast codes for taste sensitivity, a main effect for expertise, and then interactions between expertise and the linear effect and the quadratic effect. To simplify the interpretation of the effects in light of the many outcomes and interaction terms, we used the discrete taste groups—non-tasters (n = 37), tasters (n = 54), and supertasters (n = 41)—as the predictor instead of the continuous taste ratings. In addition, we examined the effect of taste group among participants who were relatively high (i.e., 1 standard deviation above the mean) and relatively low (i.e., 1 standard deviation below the mean) on expertise (Aiken & West, 1991). We estimated the models in Mplus 5.21, using maximum-likelihood with robust standard errors.

Our main hypothesis was that the quadratic effect of physical taste sensitivity on aesthetic judgments would be moderated by individual differences in art expertise. For disgust, as predicted, we found an interaction between art expertise
and the quadratic taste sensitivity effect (β = −.143, p = .05), indicating that the nonlinear effect of taste sensitivity varied across levels of art expertise. We also observed a main effect of art expertise (people high in expertise reported less disgust; β = −.223, p = .002). Figure 3 depicts the estimated means. For people low in art expertise, there was a U-shaped, nonlinear effect of taste sensitivity: people high and low in taste sensitivity reported the most disgust. For people high in art expertise, in contrast, taste sensitivity had no effect on disgust.

For pleasantness, there was only a main effect of art expertise (β = .275, p < .001): people high in expertise found the pictures more pleasing. Unlike Studies 1 and 2, pleasingness scores had unusually restricted variability: for all eight pictures, the modal response was 1 on the 1 to 7 scale, creating a floor effect.

Figure 3. Taste sensitivity, art expertise, and disgust: Study 3.
Consistent with Study 2, we found no main effects or interactions with anger ratings. There was a lone main effect of expertise ($\beta = -0.244, p < .001$), in which people higher in art expertise reported less anger. Physical taste sensitivity thus had a specific impact on avoidance-related negative emotion instead of having a general effect on negative emotions.

In short, we found evidence that expertise in the arts moderates the effect of miscalibrated taste sensitivity on aesthetic judgments, namely judgments of disgust in response to negative and controversial art. The moderating effect of art expertise is congruent with a large body of work that shows that experts and novices experience art differently (e.g., Augustine & Leder, 2006; Kozbelt, 2006; Parsons, 1987; Silvia, 2006). People lower in art expertise displayed a sharper nonlinear effect of taste sensitivity, whereas people higher in art expertise showed no effect. Studies 1 and 2 found weaker nonlinear effects of taste sensitivity, presumably because art expertise went unmeasured and hence unmodeled in those studies.

**GENERAL DISCUSSION**

Taste can refer to how people experience food or beverages, but it is also used to describe how people experience visual art. The current research focused on one possible biological mechanism underlying taste for visual artwork. Across three studies, we found consistent evidence for the miscalibration hypothesis, which predicts that extreme physical taste sensitivity will relate to extreme responses to visual art. Specifically, participants with extremely low or high physical taste sensitivity made relatively extreme evaluations compared to participants with average taste sensitivity. The effects of physical taste sensitivity on evaluations of artwork were most pronounced for disturbing and provocative artwork, which confirms prior work suggesting that negatively valenced stimuli have a stronger impact on evaluations than do positive stimuli (Baumeister et al., 2001). In addition, the results of Studies 2 and 3 showed that extreme taste sensitivity led participants to express responses specifically linked to avoiding disturbing images (high levels of disgust) as opposed to expressing general negativity toward the disturbing images. We found no differences on the negative, approach-related emotion of anger (Carver & Harmon-Jones, 2009).

The results of Study 3 showed that the relationship between miscalibrated physical taste sensitivity and aesthetic judgment was found only among participants who had relatively little artistic expertise. These findings suggest that when asked to make aesthetic judgments, people who have relatively little artistic expertise depend primarily on their tacit, intuitive responses, which are affected by factors such as genetic predisposition for taste sensitivity. People who have relatively high levels of artistic expertise, in contrast, have an expansive knowledge and experiential base from which to draw when making aesthetic judgments. Expertise in the arts thus eliminates the effect of miscalibrated physical taste sensitivity on aesthetic judgments.
Limitations and Future Research

Though the results across the three studies consistently supported the miscalibration hypothesis, the work had some limitations that warrant consideration. One limitation is that we focused on one type of aesthetic behavior—the experience of visual artwork—and hence it is an open question whether our results apply to other types of aesthetic behavior. We believe that the stimuli used in the current work, which were all static images, may have underestimated the strength of the link between physical taste sensitivity and art preferences. Because dynamic stimuli produce stronger emotional responses compared to static stimuli (e.g., Weyers, Muhlberger, Hefele, & Pauli, 2006), we would expect that viewing disturbing aesthetic behavior would produce especially strong reactions among non-tasters and supertasters with low levels of expertise in the aesthetic behavior.

A second limitation is that we did not take into account non-genetic factors that may influence taste sensitivity. Chronic caffeine or nicotine use, both of which influence taste sensitivity (Kunin, Bloch, Terada, Rogan, & Smith, 2001; Palmatier & Bevins, 2001; Snedecor, Pomerleau, Mehringer, Pomerleau, & Ninowski, 2006), may suppress the effects of sensitivity to PTC on art preferences. Future work may explore how PTC sensitivity interacts with chronic behaviors that influence taste sensitivity to predict art preferences.

Future work may explore the potential evolutionary basis of our findings. Selection pressures posed by infectious microbes were involved in the development of the behavioral immune system, which served the function of promoting the behavioral avoidance of any carrier that might threaten one’s ability to survive and reproduce (Schaller, 2006; Schaller & Duncan, 2007). Crucially, the behavior immune system produces domain-general responses because it is more beneficial for people to avoid objects that may threaten their well-being than to avoid objects that may be a boon to their health. If sense of taste evolved to alert people to substances that may threaten their health, then a by-product of that adaptation may involve having heightened avoidant responses to visual artwork among people with miscalibrated taste sensitivity.

CONCLUSION

The present results provide novel insight into why people frequently describe sensitivity to artwork in terms used to explain physical taste sensitivity. Although linking taste for artwork with gustatory sensitivity may represent a simple linguistic metaphor, the tendency to think in perceptual terms when describing complex concepts demonstrates a fundamental way that people relate to their environment (Lakoff & Johnson, 1999; Tolaas, 1991). Indeed, a growing body of evidence suggests that the use of metaphor helps to explain general affective experiences. Happiness is frequently described as feeling “up” (rather than “down”), bright objects are good (and dark objects are bad), and vertical “heightness” is divine (Meier, Hauser, Robinson, Friesen, & Schjeldahl, 2007;
Meier & Robinson, 2004; Meier, Robinson, & Clore, 2004). The current investigation adds to this growing body of literature and suggests that taste for artwork is rooted at least partly in biological differences in physical taste sensitivity, but that these biological differences have their effect primarily among those with low artistic expertise. Although our results do not directly refute William Bernbach’s statement not to “confuse good taste with the absence of taste,” they do suggest that miscalibrated taste sensitivity, coupled with low artistic expertise, relates to extremity of judgments of disturbing and provocative art.

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