

A Re-evaluation of the Sense of Smell: How to Feel and Express Scents *

IWASAKI Yoko

Kyoto-saga Art College, Kyoto

Abstract: This paper examines the properties of the sense of smell, not only from a traditional aesthetic and philosophical perspective but also from the more recent perspectives of physiology, neuroscience, and cognitive psychology. It then describes what role the sense of smell could play in aesthetics as a 'science of the senses' in the future. The sense of smell has been condemned as barbaric, dull, and subjective, and there have been very few works of art that engage with the sense of smell. However, since the beginning of the 2000s, there has been an increase in scientific research into olfaction and a corresponding increase in artists and artworks that use odour and scent as their primary medium. Unlike vision, which perceives objects in space, olfaction is a chemical sense caused by reactions in the body. Olfaction is a cross-modal perception that is susceptible to the influence of other senses and is an 'odour-object' perception influenced by experience and memory. In fact, this is probably the most important feature of the proximity between olfaction and art. We conclude by reconsidering the potential of olfaction and art in aesthetics as a science of sensibility.

Keywords: sense of smell, olfactory art, odour object theory, ecological olfactory theory, layered structure, nostalgia

1. Introduction

This article examines the characteristics of the sense of smell, not only from a traditional aesthetic and philosophical perspective, but also from the perspectives of physiology, neuroscience and cognitive psychology. It then describes what role the sense of smell can play in aesthetics as a science of the senses and suggests what is needed for olfactory aesthetics to take root in society in the future.

The conventional assumption in philosophy and aesthetics is that, among the five senses, the status of the sense of smell has not been highly regarded. Since Linda Buck and Richard Axel were awarded the Nobel Prize in Physiology or Medicine in 2004, for their discovery of olfactory receptors, scientific research on olfaction as a physiological function has advanced dramatically, resulting in an increase in research on olfaction in fields such as neuroscience and cognitive psychology. Correspondingly, since the early 2000s, the number of artists and artworks that use smell and scent as their main medium has increased. Olfactory art has become increasingly prominent in recent years as a means of highlighting a slice of human existence and has even led to the creation of an international award.¹

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This article first reviews the criticisms of olfaction in conventional Western thought, such as aesthetics and philosophy, as well as various theories of physiological function. Then, it re-examines how we smell and perceive odours, using the latest findings from neuroscience and cognitive psychology as support. Learning and memory play a major role in odour perception. If we call an awareness of “odour objects” the perception of smells in the wider context of time and space, rather than attributing the causes of olfaction solely to odour molecules, then it can be assumed that this way of being has been anticipated in the rapidly developing practice of olfactory art since the beginning of the 2000s.

The “Madeleine phenomenon,” described by Proust at the beginning of *In Search of Lost Time*, in which the past is vividly recalled by smell, is often taken up as the theme of olfactory art works, nostalgic memories evoked by smell. The sense of smell is a sign of human existence that is inseparable from space and time. Reflecting on how we smell and how we express ourselves opens the possibility for rethinking human existence from a different perspective.

2. Philosophy and science of the sense of smell

2.1. Philosophy of the nose, aesthetics of smell — olfaction in Western thought

According to Chantal Jacquet, author of *Philosophie de l’odorat*, only a few philosophers over the past two millennia of Western thought—that is, since the Greek philosophers—have made a positive evaluation of the sense of smell. Of these, only three, Lucretius, Condillac and Nietzsche, are mentioned in her book.²

The most important criticism by philosophers concerns the subjectivity of olfactory judgements. Unlike what we see or hear, olfactory judgements are ambiguous. They are also inseparable from feelings of pleasure or displeasure as a physical judgement. The subjectivity of the senses is opposed to rational judgement. In Descartes' analysis of beeswax, odour is not part of the essence of beeswax, but is merely a shifting sensory property, which Locke refers to as the “second nature.”

The animal nature of the olfactory sense is also often raised as a point of contention. This, especially in conjunction with the post-medieval Christian debasement of the body, has led to a consistent aversion to scents that are easily associated with physical pleasures, such as flamboyance and sensuality. Smells that tend to arouse human desires, such as appetite and sexuality, have been

¹ In 2002, The Institute for Art and Olfaction (IAO) was founded in Los Angeles, California. In 2004, the IAO created an award system for olfactory art, the Art and Olfaction Award, which includes the Sadakichi Award for olfactory art.

² Lucretius used an analogy between smells and the soul to explain the reality of the invisible soul or spirit, using the structural model of smells, due to the diffusion of tiny invisible molecules, which are reliably captured by the sense of smell as an expression of truth, no less than reason. Condillac envisaged a statue without a single sense organ to describe the importance of touch, rather than sight, among the five senses, and attaches the nose first. This is because the sense of smell contributes the least among the senses, but he affirms that the sense of smell alone actually has the functions of the other senses, such as memory, judgment and imagination. Nietzsche actively defended the sense of smell as the root of his body-praising philosophy; see Jaquet, Chantal. 2010. *Philosophie de l’odorat*. Paris: Presses Universitaires de France, pp. 352–425.

regarded as enemies of rational judgement and degraded as animalistic objects.³

Finally, the distance of the sense of smell from the object of perception is often also an issue. Aristotle argued that olfaction is both a non-contact external sense and an internal sense by direct contact.⁴ This way of being, called an “internal sense,” refers to the close distance between the nose and the smell. Kant similarly stated that the sense of smell is not objective, but subjective, as it works without the mediation of external things and cannot capture the nature of external objects.⁵

The inferiority of the nose in philosophy is directly linked to the stagnation of smell aesthetics and olfactory art, and artworks that use smell and scent as their main medium were almost non-existent until the appearance of Duchamp's series of works on smell⁶ and air in the early 20th century.⁷ Recently, this trend has also been addressed from a gender perspective.⁸

2.2. The science of olfaction

The sense of smell is the oldest sensory organ to appear in living organisms and functions as an information-processing system deeply involved in survival and reproduction. The science of olfaction has undergone rapid development in recent years. This is due to the discovery of long-suspected olfactory receptors by Linda Buck and Richard Axel in 1991, who were awarded the Nobel Prize in Physiology or Medicine in 2004. The discovery of the receptors opened the way for chemical signaling of odour molecules into the brain, and the neuroscience and physiology of olfaction took off. The scientific explanation of how olfaction works is as follows.⁹ Airborne odorous substances adhere to the olfactory mucosa, which covers the olfactory epithelium at the back of the nasal cavity. The olfactory mucosa is lined with millions of olfactory cells, of which there are currently 396 types known in humans. Olfactory cells have olfactory cilia, at the end of which there are receptors to capture odour substances. When the receptors

³ In contrast to these common phrases, it should be noted that incense is used in religions such as Buddhism and Christianity. Apart from odours in daily life, perfumed incense is associated with holiness (Le Gu er, Annick. 2000. *Les pouvoirs de l'odeur*. Translated by Atsuko Imaizumi. Tokyo: Kosakusha, pp. 148–151). The medieval intermediate positions of the spiritual sense of smell and the physical sense of smell, neither of which is subordinate to the other in the various senses, were also explained to me by Dr Hitoshi Yokomichi, of Osaka University.

⁴ In other words, the simultaneous belonging to two domains, the external sensation from non-contact stimuli, such as sight and hearing, and the internal stimulus from direct stimulation of the body, such as taste and touch, leads to an ambiguity in the judgement of odour. See Aristotle, Aristotle. 2014. "On sensation and the sensed" In *The Complete Works of Aristotle*, Vol. 7, 445a5. Tokyo: Iwanami Shoten, p. 239.

⁵ Kant, Immanuel. 2003. "Anthropology." In *Kant's Complete Works*, Vol. 17, vii A154. Tokyo: Iwanami Shoten, p. 63.

⁶ Duchamp is a pioneering olfactory artist in the context of contemporary art. He escaped painting's spell on the "smell of varnish" in oil paintings and used the scent of coffee beans and cedar in what is now called installation work (Jaquet, Op. cit., pp. 295–296.), as well as works in which he bottled the smells of the streets of Paris.

⁷ On the typology of olfactory art, see my article. Iwasaki, Yoko. 2016. "Scent as Art: How Can Scent Become Art." *Studies in the Culture of Taste*, no. 1 (March 31): pp. 28–35. Society for the Study of the Culture of Taste.

⁸ Korsmeyer critically elucidates the implicit norm of misogyny latent in the binary structure of conventional Western thought. She analyses food and taste, in particular, as "gender in depth," but the same matter fits squarely in comparison with analyses of the inferiority of the sense of smell. The subjective, animalistic, zero distance between taste and smell has always been omitted from the highways of philosophy and aesthetics, as it pertains to femininity, which may be one reason for the neglect of the sense of smell in philosophy and aesthetics. Korsmeyer, Carolyn. 2004. *Gender and Aesthetics: An Introduction*. London: Routledge, pp. 89–121.

⁹ Hasegawa Fragrance Corporation. 2002. "The Wonder of Smell and Fragrance through Pictures." Tokyo: Kodansha, p.100.

receive the odorant, the olfactory cells are activated and the chemical signals of the odorant are converted into electrical signals and transmitted to the glomeruli in the olfactory bulb, one of the tissues of the brain. The signals collected in the glomeruli are transmitted to the olfactory cortex and then to the amygdala and hypothalamus, which are deeply involved in emotions, before moving to the hippocampus, which controls memory, and the orbitofrontal cortex, where odour identification and value judgments are made.

The leading model for sensory research has always been vision. With the development of vision research in the 1950s, the mechanisms of vision were explained by topography mapping in the brain, which was developed in the field of neuroscience. External stimuli generate localised neural patterns in specific functional areas, which process visual information as perceptions. In olfaction, such a model has been the mainstay of olfactory research,¹⁰ but criticism of this idea has emerged in recent years.

The main point of criticism concerns odour identification. It is claimed that the approximately 390 types of human receptors can discriminate between some 400,000 different odour substances. This is possible because no single odour compound is exclusively associated with a particular receptor, but instead bind to multiple types of each other. A.S. Barwich, a cognitive scientist at Indiana University, has questioned this idea. She argues that the coding of receptors in the olfactory epithelium is too complex for the above explanation to be possible, rendering it doubtful that there is actually a corresponding odour map in the brain.¹¹ There is too much variation in olfaction from one person to another to allow a particular odour perception to be mapped in the brain as the “correct” representation of that odour substance.¹² While vision can be encoded in terms of color wavelengths, the case of olfaction is more complex, and structural homology is impossible to predict, as odour substances with quite different perceptual content often have similar molecular structures and vice versa.¹³ In other words, Barwich argues, “odors are not coded by mapping.”¹⁴

American neurobiologist D.A. Wilson and psychologist R.J. Stevenson have made similar claims. They criticise conventional physiological olfaction research, which assumes a correspondence between stimuli and the brain, calling it the “stimulus—response model.” They suggest that there are no ordered clusters or underlying structures (e.g., “primary odours,” like the three primary colours in vision) on which the model is based, and that no systematic association between chemical structure and sensation can be found in olfaction.¹⁵ So, how are odours actually perceived, according to the latest findings in neuroscience and cognitive psychology?

¹⁰ Mori, Kensaku. 2010. “Smell Map in the Brain.” *PHP Science World Shinsho*, pp. 58–107.

¹¹ Barwich, A. S. 2020. *Smellosophy: What the Nose Tells the Mind*. Kindle edition. Cambridge, MA: Harvard University Press, p. 71.

¹² *Ibid.*, pp. 88–89.

¹³ *Ibid.*, p. 104.

¹⁴ *Ibid.*, p. 109.

¹⁵ Wilson, Donald A., and Richard J. Stevenson. 2006. *Learning to Smell: Olfactory Perception from Neurobiology to Behavior*. Baltimore: Johns Hopkins University Press, p. 16.

3. The odour object theory

3.1. Problems with the stimulus–response model

Let us summarise the problems Wilson and Stevenson identified with the stimulus–response model. Sight, hearing and touch are physical senses perceived at a distance from the object, whereas smell and taste are chemical sensations that occur within the body. Perception is stimulated by the chemical effects that airborne substances cause in animals. In such cases, there is no clear, purely chemical stimulus. The odours that are important to living organisms for the maintenance of individuals and offspring are complex mixtures of chemicals; therefore, “the primary task of the olfactory system is to recognize these mixtures by sniffing them out from background odors.”¹⁶

Moreover, unlike the vision of fixed objects, these odours need to be selected from constantly changing background stimuli, adapting to unstable odour stimulus patterns that change over time and from place to place. However, these matters are difficult to explain in a stimulus–response model. To extract the necessary information from the vast amount of information that is unique to each experience, we require the means to analyse vast amounts of information instantaneously. Even if this were possible, the fact that animals and humans cannot smell a mixture of three, four or more odours again casts doubt on the stimulus–response model, which assumes that a single sensation is produced by a single functional group. Another question is why odour is perceived as a constant construct, even though it has characteristics that make it difficult to remain constant in intensity and quality, and is prone to alteration. For these reasons, we can conclude that odour perception requires a different model than stimulus–response.

3.2. Odour objects

Wilson and Stevenson point out that olfaction requires integrated processing or experience, that is, perceptual learning. Various odour substances are received by receptors and integrated in the central system to shape perceptual experience. Therein, the integrated perception is captured by experiential and integrative processing that enables it to withstand interference, intensity changes and degradation received from background odours. This means that olfaction selects combinations of chemicals that are meaningful to the individual from the many other stimuli occurring, which Wilson and Stevenson call “odor objects.”¹⁷

One example given to help visualise the smelled object is the act of “reading the letters.” Although the individual letters of the alphabet themselves have no meaning, when combined, they convey the idea that coffee is coffee. In some cases, even if there are missing letters, such as in the spelling “coffe,” the word can still be read as “coffee” by analogy. By contrast, this example is flawed in terms of describing odour objects. That is, the letters spelling coffee can be disentangled and analysed as “c, o, two f’s and two e’s,” but the integrated odour object is perceptually difficult to disentangle and analyse. This is because humans cannot distinguish and recognise the approximately 600 volatile components that make up a coffee odour object.¹⁸

¹⁶ Ibid., p. 18.

¹⁷ Ibid., p. 19.

¹⁸ Ibid., p. 6.

However, once a mixture of 600 types has been “templated” as a morphological (configural) and unified odour object, the memory is retained and the odour is recognised, even despite minor odour alterations, deterioration or background differences.

The combination of stimuli here is not limited to olfactory stimuli, but also includes multimodal information that is formed in combination with other sensory stimuli, such as taste and vision, that are input at the same time. Thus, the multimodal odour objects that are repeatedly learnt are established in dependence on context, attention, expectation and experience.

3.3. The interface between philosophy and science

Although stimulus—response models still dominate scientific research on olfaction, there has been a gradual increase in recent years in studies that view olfaction in terms of odour object methods. Almost a decade after Wilson and Stevenson, and with the aid of findings from neuroscience, cognitive science and philosophy, Barwich, coming from the same perspective, described the need to re-examine the scientific findings of olfaction and the traditional philosophical arguments for it. She noted that olfaction “does not mirror the world, but interprets it” and that, to study it, we should stand at “the intersection of science and philosophy.”¹⁹ Further:

The fact that there are so many layers to smell shows that its content cannot be explained without an understanding of sensory processing. It is highly misleading to talk about odor alone as something without a mental background. [...] Smell is an interpretation of physical information in the light of the ongoing action of physiology and cognition. Ultimately the same stimulus may be interpreted differently and processed into different odor images.²⁰

The subjectivity of olfaction, its connection to desire and its zero distance from the object, which philosophy has repeatedly criticised since antiquity, reappears in new forms from Barwich's neuroscience and cognitive science perspective.

Philosopher and aesthete Larry Shiner is also part of this line of research. In his work on olfactory aesthetics, he devotes a chapter to the sense of smell from the perspectives of neuroscience and philosophy, examining one by one what has been pointed out in traditional philosophical fields, such as its emotional susceptibility to pleasure and displeasure, its inability to be named and its unconscious perception.²¹ Finally, he points out that olfaction is not as cognitively inferior as historically believed, but rather that it perceives objects in a multisensory way using a network of various neural circuits in which context plays a major role.²²

Similarly, the work of Andreas Keller, who holds PhDs in neuroscience and philosophy and currently runs a gallery of olfactory art in New York, is also noteworthy. Keller emphasises the strong link between olfaction and emotion and is adamantly opposed to the idea of odour as a

¹⁹ Barwich, Op.cit. p. 11.

²⁰ Ibid., p. 115.

²¹ Shiner, Larry. 2020. *Art Scents: Exploring the Aesthetics of Smell and the Olfactory Art*. Oxford: Oxford University Press, pp. 37–53.

²² Ibid., p. 65.

spatial perception. Thus, like Stevenson and his colleagues, he hesitates to even call the objects of odour perception “odour objects” and tries to depict in his writings a kind of olfaction that does not have boundaries like an object, but is instead a kind of temporal transition of qualities.²³ This is exactly the kind of thinking that is in line with J.J. Gibson's ecological theory of vision, which could also be called “ecological olfactory theory.” According to Gibson, perception is precisely about carving out the boundaries from a continuum of different qualities.²⁴

4. Ecological Olfactory Theory

4.1. Object perception in vision

Object perception is not a new concept and has been described by Berkeley and William James in the old days, with serious research originating in Gestalt psychology in Germany in the 1930s. It has evolved into modern perceptual and cognitive psychology. Gestalt psychology does not view the senses as an accumulation of their elements, but as a morphological whole. Wilson, Stevenson and Barwich often cite the perceptual psychologist J.J. Gibson, who developed the ecological vision theory in the 1960s and 1970s. His theory was influenced by the Gestalt psychology of Koffka and others and James's functional psychology.

What mattered to Gibson were environments that made sense to the organism. These are not static, like snapshots, but instead directly perceived as constantly in motion, subject to deformation and shielding. These perceptions, inspired by an ecologically useful environment, are what Gibson calls “affordances.” Affordance is the extraction of information pickups from the various layers of information in the environment. It calls for extracting useful information in motion, rather than passively perceiving a lot of information as existing objects.

4.2. Ecological olfactory theory - the importance of context

The commonality between ecological visual theory and odour objects lies precisely in the point made above. Neither passively translate perceptual stimuli, but instead extract useful information from the environment as actively interpreted perceptions. They learn to encode this assortment of information to recognise the combinations of chemicals that make up the various objects in a complex background that shifts to obtain information useful for maintaining the individual. In the case of olfaction, it is the combination of a wide variety of objects and background stimuli (i.e., odour objects) that are captured. If we call this the “ecological olfactory theory,” after Gibson, what similarities and differences are there between it and the ecological visual theory?

The first similarity between the two is that both involve cognition based on memory as learning from past experiences. In particular, regarding olfaction, a familiar odour can lead to different perceptions than the first time a scent is smelled.²⁵ Both can also comprehensively encode information from other sensory organs and overlap with the various pieces of information provided by each sensory organ. This cross-modal nature is considered a particularly prominent

²³ Keller, Andreas. 2016. *Philosophy of Olfactory Perception*. New York: Palgrave Macmillan.

²⁴ Iwasaki, Yoko. 2009. "Design of Smell." *Aesthetic Studies a+a*, no. 13: pp. 52–65.

²⁵ Wilson and Stevenson, *Op. cit.*, p. 20.

feature of the sense of smell, such as the effect of taste on odour.²⁶ Stevenson and colleagues have also found cross-modal coding of olfaction in connections with brain regions, such as the piriform cortex and orbitofrontal cortex, demonstrating a close link between smell and the memories and emotions these regions control.²⁷

One difference between the two is that, in olfaction, differences in concentration are more significant than in vision. Another difference is that while vision initially perceives three-dimensional space on a two-dimensional retina, olfaction is not a spatial perception.²⁸ For this reason, it cannot be established as the perception of an object, and it will be encoded without the boundaries associated with a tangible object.

The most important difference is the role of language.²⁹ Many people say “apple” when they see an apple, though it is also possible to describe it as a “fruit” (upper category) or “*santsugaru apple*” (lower category). In the case of olfaction, however, there are few upper or lower categories.³⁰ The language used to describe an odour almost always only describes its source, and different types of apples are often also described as having an “apple scent.” The role of language in object cognition is significant; “rather than language forming perception, perception forms language.”³¹ However, does this not also mean that the structure allows for the induction of perception by language?

Barwich gives an interesting experimental example. A mixture of butyric and valeric acids, mixed with the odours of patchouli, pine oil, menthol and violet leaf, was placed in separate jars and labelled as “Parmesan cheese” on one side and “vomit” on the other. She noted that 83% of the subjects recognised both odours as they were labelled.³² This shows the importance of context in odour: the influence of language labelling on the same odour is significant.

Many molecules arise in all kinds of situations and chemical environments, where the content and value of information can change dramatically. There is no unique 'inherent meaning' or 'represented concept' that can be coded with isolated stimuli and extracted from context-specific odor experiences. The human brain learns to associate stimuli with various semantic concepts, usually aided by further cues (e.g., words and gaze). So the brain can 'interpret' the properties of butyric acid as parmesan cheese or vomit, depending on the context.³³

The result brought about by this comparison of smelling objects with vision as an ecological olfactory theory is that olfaction is significantly more dependent on context, including memory and language through experiential learning. The reason for this can be speculated as follows: whereas in the case of vision, which includes spatial perception, objects can be cut out of the

²⁶ Ibid., p. 247.

²⁷ Ibid., p. 247, Stevenson, Richard J., et al. 2009. "The Functional Role of the Medio Dorsal Thalamic Nucleus in Olfaction." *Brain Research Reviews* 62 (1).

²⁸ Keller, Op.cit., p. 192.

²⁹ Wilson and Stevenson, op. cit., p. 252.

³⁰ Ibid.

³¹ Ibid.

³² Barwich, Op.cit., pp. 264–265.

³³ Ibid., p. 265.

background in a narrow range, in the case of olfaction, which is not based on spatial perception, but rather chemical perception, objects are cut out in a time transition, so experience is remembered in a wide range of time and space, including the situation before and after. It is thought that memories of experiences are also stored in a wide range of time and space, including the situations before and after them, so that these are perceived as objects all together.

5. The sense of smell and art

If the sense of smell is situated at the intersection between philosophy and science, aesthetics is also situated there. When defining aesthetics as a science of the senses, we can observe events in the practice of olfactory art that confirm the position of the sense of smell and aesthetics.

What is olfactory art? It refers to art that stimulates the sense of smell, uses smell as the main medium, or art that takes smell and the state of the sense of smell as its subject matter. However, in olfactory art that consists of scents and images, for example, the images are sometimes regarded as “noise” when measuring scientific effects. It is not accurate, however, to say that the images are noise, but rather that olfactory art is multimodal in nature and plays a role in generating a multisensory context, which is closer to the original human sense of smell than a single odour presentation. Reviewing olfactory art from the perspective of smelled objects provides an opportunity to rethink aesthetics as a science of sensibility in which human beings generate multisensory contexts in a multimodal way. By placing the sense of smell, which in the history of thought, including aesthetics, has been regarded as a subjective sense that cannot be distanced from its subject, at the center of artistic expression and appreciation, it also means re-examining it as a lived experience through the creation and appreciation of art. For example, when creating a work on the theme of “nostalgic smells and memories” (see below) and having viewers actually experience these, the problem arises concerning how to get as many people as possible to experience and recall the individual and subjective sense of smell and memory as their own through a single work of art, and various specific solutions for the problem were sought. The project aimed to find concrete solutions using a variety of methods.

5.1. Layered structure of nostalgic smells

In 2016, we conducted a survey with elderly people in Ninohe City, in Japan’s Iwate Prefecture, asking them, “What smells are nostalgic for you?” The aim was to identify these smells and use them in artworks to create pieces that evoke familiar and nostalgic memories.³⁴ Starting with this research, and in the process of expressing and producing olfactory research, we completed a number of trial-and-error iterations regarding the content and methods of olfactory art expression. These have been described in previous papers, which sometimes questioned the definition of olfactory art and the relationship between the sense of smell and other senses,

³⁴ Sugihara, Yuriko, and Yoko Iwasaki. 2008. “Examination of Emotional Change and Memory Recall by Art Using Nostalgic ‘Smells.’” *Aroma Research*, no. 74: pp. 155–161.

expressions and materials.³⁵

This first survey contained important details about the smell experience. While many respondents answered with a single word for a nostalgic smell, such as the smell of glutinous rice cakes, there were also those who answered with a layered smell, such as “the smell of dew on my clothes and my mother's sweat when I came home from mowing early in the morning when I was in primary and junior high school.” These memories themselves had layered structures like the early morning, grass and sweat in the recalled scene. This is because the memory of smells can include visual or other olfactory memories. This suggests that memories of smells are embedded in “scenes” that include visual and other olfactory senses. As for the person who answered “the smell of glutinous rice cakes,” above, when asked for more details, he replied: “It was the smell when my mother used to make it for me when it was cold in the winter mornings. Now, I make it myself.” It can be inferred that the respondent was recalling the smell of steaming rice cakes with the cold morning air in the background. This shows that smells do not have meaning in isolation but are instead captured in the context of the environment, such as the season and time of day, the situation at that time and the relationship with the people and creatures with whom they spent times. They are inscribed as nostalgic memories in a layered structure of environmental and site-specific smells. This structure, which was described as the “layered structure of odour” at the time, is exactly how odour objects operate and shows that odours are perceived together with memories and cross-modal ways of being.

5.2. Subjectivity of odour

When we surveyed people with many attributes about familiar smells, not only in the survey in Ninohe, but also in its pre-survey, we noticed something. There were nearly 100 variations in the answers given by 100 people. If visual information, such as “nostalgic films and actors,” or auditory information, such as “nostalgic songs,” was asked about, it might be possible to make some sort of ranking; however, there are differences between generations when it comes to “nostalgic smells,” and although some commonalities can be found,³⁶ we could infer from the survey in Ninohe that it would be difficult to create rankings, given scents’ marked differences, as compared to visual or auditory information.

This is a natural conclusion, if we consider that a smelled object is not isolated from its background as a stand-alone object, but can be captured in a multimodal way in a wider range of time and space that results in the individuality of the object standing out.

5.3. Significance of olfactory art

Is it impossible to appeal to the emotions of many people with artworks that use smells, given that they are so individualised? Art can elicit empathy and emotion from many people by expressing personal feelings and thoughts through mediums such as sound and color. The same

³⁵ Iwasaki, Yoko. 2006. “Scent as Art: How Can Scent Become Art?” *Journal of Taste Culture*, no. 1: pp. 28–35.; Iwasaki, Yoko. 2007. “Why Is the Art of Fragrance Interesting? Beyond the Conventional ‘Theory of the Body.’” *Aesthetic Studies a+a*, no. 17: pp. 24–37.

³⁶ Yamamoto, Kohsuke, Takeshi Kobayashi, and Tatsu Kobayakawa. 2008. “What Is Natsukashii Odor in Japan: An Investigative Study on Odor That Evokes Nostalgia.” *Aroma Research*, no. 81: pp. 44–47.

applies to olfactory art, which uses the subjective sense of smell. There are two key points needed for olfactory art to elicit empathy and emotion from many people.

The first is the elimination of the sense of sight. When visual information, such as images and paintings, is combined with smells, the visual information is pulled in at a considerable rate. For example, if a nostalgic smell is presented alongside visual information about the seaside under the title “the smell of my hometown,” the seaside scene does not elicit any emotion among those who grew up near mountains, and the smell recalled by the title cannot be captured properly.

The second point is to use vague and abstract smells that are not too concrete or specific, and whose origins or names cannot be immediately determined. In *Box of Eurydice* (2008), by Yasuaki Matsumoto, a small silverware containing the smell of baby powder is placed in a small paulownia wood box. When the box is opened, a sensor plays environmental sounds. By experiencing this artwork, which consists of only minimal elements of smell and sound, elderly people’s own memories were suddenly awakened, and they began to tell various stories freely and actively, surprising the family members and carers who were close by. In this work, visuals were excluded and the dominant scent was baby powder, an ambiguous and abstract odour that can evoke various contexts, such as bath, baby, family, deodorant in the bathroom, etc. The sounds played were similarly ambiguous, such as the sound of running water, which can be perceived differently by different people, perhaps as the sound of a babbling brook or the sound of a washroom. Instead of a single assumed memory being induced unambiguously, the olfactory art drew out the active nature of each person to pick up their own memories. This is an example of how a single work of art can access the individual memories of many people through smell.³⁷

6. Conclusion

This section summarises how rethinking the sense of smell contributes to aesthetics as a science of the senses. It is possible to appreciate a painting without having any physiological knowledge of vision, or how to see; however, in view of the way in which reflections on vision have deepened the visual experience of art, as with the mastery of depicting perspective during the Renaissance and the distinction made by the October school of art critics since the 1970s between vision and visuality, by gaining deeper insight into and organizing the sense of smell in more detail, we can expect to deepen the use of artworks as mediums and the way we view them, and to expand into a new aesthetic framework that differs from the aesthetic thoughts centered on the sense of sight.

The key to this new aesthetic framework is the way olfaction leads to object perception. Every sense leads to object perception. There are almost no single sensory stimuli in the real world, and people focus their senses on what is useful to them and what they want to pay attention to from among various layers of perceptual information. Among the senses, what is characteristic

³⁷ Matsumoto, Yasuaki, and Yoko Iwasaki. 2009. "Natsukashi-Doft Minnen." *Bulletin of Saga University of Arts*, no. 44: 105–112.; Iwasaki, Yoko, Yasuaki Matsumoto, and Yuriko Sugihara. 2009. "Experiences of Fragrance Artworks by the Elderly in Sweden and a Report on a Visit to the BPSD Registry Institute of Lund University." *Bulletin of Saga University of Art and Design*, no. 44: pp. 45–50.; Iwasaki, Yoko, Yasuaki Matsumoto, and Yuriko Sugihara. 2000. "Smell Art Workshops in Sweden." *Bulletin of Saga University of Arts*, no. 45: pp. 65–70.

of olfaction is that it is particularly strong as a cross-modal object perception related to memory; in other words, it is context-dependent. Given a picture of an apple, few people would mistake it for a banana, but the scent of an apple is often mistaken for that of a banana. Smells are unlikely to function on their own or within different contexts, but when guided by context, when a specific odour stimulus is identified out of a complex overlap of sensory perceptions, the constellation is perceived as including an expanse of time and space, just as a specific constellation suddenly emerges from a star-filled night sky. Rethinking the sense of smell illuminates this means of perception.

Olfactory aesthetics and art have not traditionally been the subject of historic study or theorisation; however, since the end of the 20th century, olfaction has been studied in various academic fields, and olfactory art has developed along with this trend. From an aesthetic point of view, it is possible to interpret this as a shift from modernity (with Duchamp as a pioneer) to postmodernity, where the sense of smell has come to be illuminated in a way that overturns conventional theories of aesthetic value. Korsmeyer's theory of the anti-aesthetic structure of taste³⁸, from a feminist perspective, can be applied in parallel to the sense of smell, and in fact, artists and thinkers who are not satisfied with conventional visually centred art and thought have focused on the sense of smell.

However, apart from such perspectives, by reassessing the sense from an interdisciplinary perspective, incorporating the findings of neuroscience and cognitive psychology into philosophy and aesthetic thought, as in this paper, makes it possible to bring a new perspective to the role the sense of smell can play in aesthetics as a science of the senses. The nature of olfaction as object perception is not ambiguous, as philosophy criticises, but rather closer to a phenomenological view of human existence. By taking an ecological olfactory perspective on human existence, in which smell is located in space and time through the complex mobilisation of various senses, olfactory aesthetics sheds light on the fundamental nature of human existence. In particular, smell and memory, which are linked together and evoke feelings deep within the human mind, bring human existence, which is inseparable from its context in time and space, into sharper relief than any other sense. To express this sense of inseparability from its layered context, the power of olfactory art and its multisensory appeal is expected. It is precisely because these sensations are highly subjective and linked to personal memories that art's method of expanding highly individual experiences to the sympathy of many people through expression is considered useful.

Finally, as a future social issue, I would like to suggest, together with Shiner, the importance of education as a foundation for thinking about the role of the sense of smell and for expressing and appreciating it through art.³⁹ Shiner argues that "the sense of smell can be refined through training."⁴⁰ Currently, primary and secondary school education, as well as art colleges and vocational schools, are still heavily visually oriented. There are also few institutions that deal with scent in terms of output, such as the exhibition of olfactory works in museums and galleries, but it is possible to train the sense of smell through intention, as wine sommeliers and perfumers

³⁸ Refer to note 8.

³⁹ Shiner, *Op.cit.*, p. 655.

⁴⁰ *Ibid.*

do. By thinking about things from an early age with the sense of smell as a theme, and using it as a medium for creating and exhibiting artworks in education, it is expected that the social acceptance of such activities will be improved. If more people consciously think about the sense of smell from an early age and start to perceive themselves in the wider range of time and space than they do visually, not only the art world, but also society as a whole, can be expected to change.

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