Empathetic Engagement with Artwork: New Insights from Neuroscience

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New research is emerging in the field of neuroscience and cognitive psychology that has implications for how art educators can help students respond to artworks with deeper levels of empathy. Empathy is an active construction of another’s experience based upon one’s own subjective experiences, memories, culture, emotions, and neurological predispositions (Immordino-Yang, 2008). Today, many scholars (Koss, 2006; Rosenblatt, 2001) consider empathy to be an essential component of an aesthetic experience. An aesthetic experience with a work of art involves an individual’s meaningful, cognitive engagement (Costantino, 2005), where cognition encompasses both mind (conceptual thought) and body (sensory and emotional thought). As the mind and body are both engaged, aesthetic experience becomes both an empathetic experience as the viewer empathizes with the subject matter and/or formal elements of the work as well as an imaginative one as the viewer engages his or her imagination to empathize with the work and to create new meaning.

Research from neuroscience now tells us that when viewing a work of art, the viewer is engaging with the work through a non-conscious process facilitated by the activation of mirror neurons in the brain (Freedberg & Gallese, 2007). Mirror neurons enable the viewer to experience or embody the subject matter, techniques, or formal qualities of the artwork, which in turn can activate the viewer’s emotions. The activation of the viewer’s emotional response to the artwork can then initiate the viewer’s empathetic response to the content experienced in the artwork. This research has implications for art education as it may suggest possibilities for helping students cultivate empathy as they engage in aesthetic experiences with works of art.

Imagery and Empathetic Response

The discovery of mirror neurons, which function as an automatic, non-conscious mimicry system programmed into our neurological makeup, may help to explain the viewer’s empathetic reaction to a work of art. Freedberg and Gallese (2007) claimed that we create interpretive meaning from the movements, emotions, and sensations of others through this mimicry process. As an example, in works of art, those who observe actions or witness
the evidence of those actions become intertwined with the physical sensations and the corresponding emotions linked with those actions. In the case of an artwork like the Hellenistic sculpture *Lacoön and His Sons*, we perceive the figures of Lacoön and his sons, and we also perceive the tension of their muscles, their anguished faces, and tense struggle to free themselves from the writhing serpents. While taking in this struggle, we may find our own heart rate increasing, our muscles tightening, our brows furrowing, and a sense of anxiety developing as we begin to empathize with the figures’ plight.

*Images of Action*

When humans observe a physical action or a segment of a physical action, such as a person turning a doorknob, hammering a nail, or throwing a pot, the mirror neuron systems in their motor cortices become active as if they were engaging in the same action (Freedberg & Gallese, 2007). However, humans do not have to observe a physical action for mirror neuron systems to be stimulated. Moving and still images of actions, such as a video segment of a dancer performing a dance or a photograph of a hand grasping a bottle, can also stimulate these mirror neuron systems (Calvo-Merino, Glaser, Grezes, Passingham, & Haggard, 2005; Johnson-Frey et al., 2003). In addition, objects with functional purposes, such as tools like scissors and wrenches and everyday items like fruit, vegetables, and clothing items, as well as phenomena that show the results of actions like handwritten letters and symbols can trigger these systems (Gerlach, Law, Gade, & Paulson, 2002; Knoblich, Siegerschmidt, Flach, & Prinz, 2002; Martin, Wiggs, Ungerleider, & Haxby, 1996). Because mirror neuron systems are activated not just by physical actions but also by images of actions and by the products of actions, works of art are also likely to active them as well.

*Images of Facial Expression*

Since there is sufficient evidence from the field of neuroscience to support the assumption that artworks can activate mirror neuron systems, we should consider what kind of subject matter of artworks might have the most potential to activate mirror neuron systems and thus provoke an empathetic response from the viewer. The abundance of research on subjects’ reactions to facial expressions suggests artworks that represent emotional facial expressions may be extremely effective at eliciting a non-conscious physical and emotional mimicry. Cognitive psychological research demonstrates the link between seeing an image of an expression and similar facial muscle activation (Bush, Barr, McHugo, & Lanzetta, 1989). Furthermore, neurological studies demonstrate how mirror neuron systems enable this type of imitation (Carr, Iacoboni, Dubeau, Mazziotta, & Lenzi, 2003; Pfeifer, Iacoboni, Mazziotta, Dapretto, 2008). When pre-adolescents were presented with images of emotional facial expressions, they showed activation in the mirror neuron areas of their brains. Interestingly, the level of this activation correlated positively with empathetic concern (Pfeifer et al., 2008). Similar neural networks were activated whether participants observed or imitated facial expressions. Carr et al. (2003) attributed this finding to the coordination between mirror neurons systems and the limbic system that forms a large-scale neural network to facilitate empathy. This distinct neural network is well coordinated at birth as newborn infants have a tendency to recognize faces and facial expressions soon after birth and to mimic those expressions (Slater & Quinn, 2001). This research implies that artworks representing emotional facial expressions are likely to produce similar emotions among viewers.

*Tactile Imagery*

In addition to facial expressions, tactile relationships are worth exploring as possible contributors to empathetic responses to artworks. Research on somatosensory systems suggests that artworks representing humans or objects in tactile relationships can create a “tactile empathy”—empathy for the tactile experiences of others (Keysers et al., 2004). Sensations such as touch, temperature, bodily position, and pain are processed by the somatosensory system, a diverse system of receptors that receive and process sensations in the skin and deep tissues. Like mirror neurons within the motor areas of the brain, neurons within the somatosensory cortices can also be activated vicariously (Keysers, Kass, & Gazzola, 2010). Research on this system demonstrates that the sight of human legs being touched (Keysers et al., 2004) and a human arm grasping an object (Grézes, Armony, Rowe, & Passingham, 2003) can activate the same section of this system that is activated when the participant is physically involved in a similar tactile relationship. Therefore, works of art that represent tactile imagery may be effective in evoking empathy within the viewer.

*Gestural Imagery*

Recent functional magnetic resonance imaging (fMRI) studies provide a neurological explanation for the empathy experienced by an observer of artworks that have pronounced gestural qualities. Examples of these kinds of gestural qualities could be demonstrated by the vibrant undulating lines of the sky in Edvard Munch’s *The Scream* or the pronounced slings of paint in Jackson Pollock’s drip paintings. When participants in one study were presented with handwritten strokes and letters, the motor areas of their brains involved in gesture became active (Knoblich et al., 2002). These findings suggest the brain can reconstruct an
action through the product of a past action it has observed (Freedberg & Gallese, 2007). Thus, when a viewer surveys an artwork, particularly one where the gestural qualities are evident, the viewer’s brain attempts to reconstruct an imitation of the action the artist undertook. Experience with the gesture involved in creating a product can enhance the motor response.

Calvo-Merino et al. (2005) found that dancers who viewed recorded performances of dances in which they were trained had higher levels of mirror neuron activity than when they viewed performances of unfamiliar dances. Hence, a person's training and interactions with the world can change the way the brain responds to movement. Within the domain of art, experience with an art technique or gesture may induce more of an embodied response. If so, familiarizing students with the techniques and processes involved in the production of an artwork may enhance their ability to empathize with the work.

**Emotion, Aesthetic Response, and Empathy**

As we learned from facial expression research, physical and emotional responses to imagery are closely related. Even when facial expressions are not involved, a non-conscious mimicry of the content or form of an artwork enhances our sensory and emotional response (Freedberg & Gallese, 2007). Johnson (2007) described several studies (Frijda & Schram, 1995; Poffenberger & Barrow, 1924) that examined this relationship between artistic form and sensory knowing. They concluded that when we perceive lines, we feel them in our bodies. When we see big curves, we experience the slow and quiet movements that we might perform if we were lethargic or sad, and, when we see smaller curves, we experience the quick movements we might perform if we were merry. Thus, emotions are intimately tied to our perception of artworks and empathetic engagement with them.

**Emotions and Aesthetic Response**

A range of emotions can be involved when a person engages with a work of art on an aesthetic level, and these emotions play an important role in facilitating or hindering empathy within the experience (Silvia, 2010). A wealth of research suggests that a mild, sublime feeling is most conducive to an aesthetic experience (Hagtvedt, Hagtvedt, & Patrick, 2008; Martindale, Moore, & West, 1988; Whitfield, 2009, as cited in Silvia, 2010). However, other emotions are also involved, and Silvia (2009) claimed these emotions fall into three families: knowledge emotions, such as interest, confusion, and surprise; hostile emotions, such as anger and disgust; and self-conscious emotions, such as pride, shame, and embarrassment.

**Knowledge Emotions**

Knowledge emotions relate to comprehending a work of art (Silvia, 2009). Interest is an important one to investigate since it closely predicts viewing time and is tied to a corporal response. Research shows that titles, especially metaphorical ones, and additional information about the work can attract interest to an artwork (Millis, 2001; Silvia, 2010). Thus, selecting artworks with metaphorical titles or providing clues about works to students may help rouse interest. In addition, art educators should carefully select artworks they deem likely to interest students or allow students to self-select works.

Surprise emotions are closely tied to interest and can be measured through subjects’ pupil dilations, which are positively correlated with preference ratings for artworks (Kuchinke, Trapp, Jacobs, & Leder, 2009). Works likely to surprise students may be well received if surprise shifts to interest, which motivates learning and engaging with new stimuli.

But surprise can also quickly shift to confusion, which can motivate withdrawal and avoidance of the stimuli (Silvia, 2010). An art viewer’s confusion level is often determined by their level of art-viewing experience (Winston & Cupchik, 1992, as cited in Cupchik, 1995). Therefore, art educators need to be responsive to the differing needs of students as they view artworks in order to help them avoid extended confusion and withdrawal. While art educators may not be able to reduce confusion in every case, metacognitive strategies can help combat it. Silvia (2010) recommended that educators teach students how to recognize confusion when it arises, reflect on it, and view it as a constructive signal to ask for additional assistance or to use additional self-regulatory strategies to form meaning.

**Hostile Emotions**

In addition to experiencing the negative emotions of confusion and withdrawal, the viewer may also experience hostile emotions. Hostile emotions occur when a viewer interprets a work as unpleasant, offensive, or contrary to personal values (Silvia, 2009). These emotions are predictive of rejecting tendencies toward the artworks. For instance, Cooper and Silvia (2009) found that hostile emotions in response to contemporary photography predicted whether participants expressed repressive attitudes toward the works and whether they were more likely to reject a free postcard of the work. Therefore, artworks that might elicit hostile emotions are not naturally ideal for cultivating empathy since empathy entails an opening of consciousness rather than a closing of one. Art educators need to know their students well enough to determine which works may be overly controversial and, thus, may hinder their ability to empathize and enter into an aesthetic experience.
Self-Conscious Emotions

Last, self-conscious emotions involve assessing a situation as similar or dissimilar to one's aspirations, values, sense of self, or personal or cultural standards (Silvia, 2009). These emotions can be collective: we experience them when we identify with another or their actions. When viewing art, students may feel pride for the works of artists with which they share some something in common, such as those of artists with the same nationality, community, culture, race, or heritage. Additionally, students may feel pride for the subject matter. For example, works that represent the local community and land might elicit such feeling. More research is needed to understand how these self-conscious emotions impact empathy and aesthetic experience.

Conclusion

Our empathetic understandings are shaped by our subjective experiences, memories, culture, emotions, and neurological predispositions—what Immordino-Yang (2008) calls “the ‘smoke’ around the mirrors” (p. 154). Because of the situated nature of an empathetic response to an artwork, and because of the multiple factors affecting a student's ability to positively empathize with the content of an artwork as discussed above, art educators need a thorough knowledge of students—their previous art experience and training, their level of fluency with interpreting images, and their personal backgrounds, values, and interests. Art educators can tailor instruction and resources to best facilitate students' empathetic responses to works of art by considering many of the concepts discussed in this paper: (a) utilizing knowledge of their students' experiences and interests; (b) understanding the brain's capacity to automatically mimic the actions, emotions, and physical sensations of others; and (c) carefully selecting the kinds of art content that will promote students' positive responses.

Highlights

1. Empathy occurs during an aesthetic encounter with a work of art.
2. Mirror neurons can help explain how we automatically mimic the movements, emotions, and sensations of others and, thus, experience empathy with them.
3. Artworks likely to produce a bodily, emotional response are those which:
   • Represent emotional facial expressions
   • Include tactile imagery
   • Represent the artist's gesture
   • Have expressive qualities
   • Include metaphorical titles or additional information
4. Emotions likely to facilitate an empathetic experience:
   • A mild, sublime feeling
   • Interest
   • Surprise
5. Emotions likely to hinder an empathetic experience:
   • Prolonged confusion
   • Hostile emotions
6. A thorough knowledge of students can help art educators tailor instruction and resources to best facilitate empathetic experiences with artworks.

References


