

## “I shouldn’t know you again if we did meet:” Prosopagnosia

Sylvia R. Karasu

New York City, New York, United States

Watching *Black Narcissus*, the eerily unsettling film<sup>1</sup> about an order of nuns cloistered in an isolated, windswept convent perched within the Himalayas, I am struggling to differentiate one nun from another. I see the nuns’ faces clearly but their hair is not visible. Hair is the first thing I notice about people. I used to think it was because my maternal grandfather, a first-generation American who had emigrated from Kiev at the turn of the last century, had been a barber. Only years later did I come to realize I had considerable difficulty processing and remembering faces, especially those whom I would see infrequently or whose appearance might change. There are others in my family who share my difficulty. My surgeon father may have suffered from this condition, though we never discussed it. He would look blankly when patients, out of his office context, greeted him. Concealing his embarrassment, he flippantly replied that he did not recognize them in their street clothes.

We are in good company: primatologist Jane Goodall,<sup>2</sup> neurologist Oliver Sacks,<sup>3</sup> and painter Chuck Close<sup>4</sup> have all written of their shame and embarrassment from *prosopagnosia*, the technical term for face blindness.<sup>3,5</sup> There is even speculation that Lewis Carroll’s Humpty Dumpty suffered from *prosopagnosia*<sup>6</sup>: Says Alice to Humpty Dumpty, “Till we meet again,” to which he replies, “I shouldn’t know you again if we *did* meet.” Alice answers, “The face is what one goes by, generally.” He adds, “That’s just what I complain of...your face is the same as everybody...Now if you had the two eyes on the same side of the nose...or the mouth at the top—that would be *some* help.”<sup>7</sup>

Carroll’s vignette is about *recognition*: etymologically, *recognition* is a “re-knowing” from a previous encounter.<sup>8</sup> Being recognized by another is crucial for the development of a sense of self.<sup>9</sup> Recognition, though, is “always tentative,” based on someone’s knowing our “manifest selves.”<sup>9</sup> Not being recognized can leave psychological scars and even precipitate deadly consequences: Oedipus becomes enraged enough to kill his own father Laius who has failed to recognize him.<sup>10</sup>

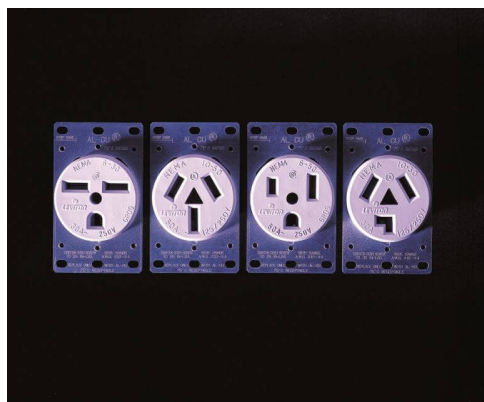


Figure 2. Electrical Outlets (2000)

memory...<sup>13</sup> His images are frozen in time and have been described as a “deliberate imitation of a passport photo...or a mug shot.”<sup>14</sup> Only Dorian Gray’s portrait ruthlessly ages, as Oscar Wilde’s Dorian remains physically unchanged.<sup>11,15</sup>

Sometimes, though, whether through aging or trauma, a face fails to provide a clue to identity. No one initially recognizes Odysseus, dressed as a beggar and waylaid for twenty years by the Trojan War and his own subsequent misfortunes, when he returns home to Ithaca.<sup>16</sup> Likewise, the treacherous husband who has betrayed his wife to the Nazis, fails to recognize her severely damaged and reconstructed face but eventually identifies her through her singing in the film *Phoenix*.<sup>17</sup>

Faces, though, because of their social importance, are a “psychologically special class of stimuli.”<sup>18</sup> A face makes an unclothed body erotic; otherwise, body parts are merely anatomy. We see faces everywhere—whenever there is an eye, nose, and mouth configuration.<sup>19, 20</sup> *Face pareidolia* is that common illusion, requiring significant “involvement of the brain’s interpretive power,”<sup>19</sup> of perceiving facial features in inanimate objects,<sup>19,20</sup> e.g., seeing Jesus in a piece of toast<sup>19</sup> or faces in Robert’s electrical outlets.<sup>20</sup> Babies as young as eight months old<sup>21</sup> and even non-human primates<sup>22</sup> have clear preferences for a face configuration. And we can readily detect faces among the common household items, books, and vegetables of Arcimboldo paintings.<sup>23</sup>

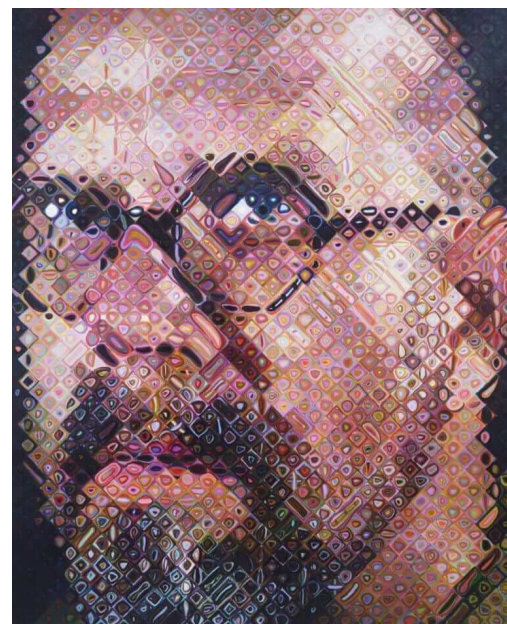


Figure 1. Chuck Close, Self-Portrait (1997) (Museum of Modern Art, New York City)

A face does not even become a face until it interacts with others, i.e., seeing or being seen, as evident in the expression, “face-to-face.”<sup>11</sup> Even the German word for “face”—*gesicht*—derives from the concept of being seen.<sup>11</sup> Recognition involves being able to retrieve and process memories, experiences, feelings,<sup>3</sup> and associated meanings—the “grammar” of a face.<sup>11</sup> Patients with the delusional Capgras syndrome can recognize people but *misidentify* them, and without that sense of emotional familiarity, think they are imposters.<sup>12</sup>

A face, though, changes with lighting, expression, viewpoint, and aging.<sup>13</sup> Even though a face remains itself during the course of life, it “does not stay the same” and is “stamped by experience.”<sup>11</sup> Portraits or photographs, though, are cross-sectional images that can “suspend the flow of time.”<sup>11</sup> Chuck Close, whose signature paintings are of enormous faces,<sup>4</sup> describes being distracted by a live, three-dimensional model. Says Close, “I have essentially no memory at all for people in real space, but when I flatten them out in a photograph, I can commit that image to



Figure 3. The Waiter (1574) by Giuseppe Arcimboldo (1527-1593)

There is remarkably little research, though, that explores what aspects of a face determine ease of recognition. *First-order information*, i.e., face detection, or what is common to all faces, involves distinguishing a face from other objects; *second-order information*, or how faces differ from each other, is a fundamentally different process.<sup>24</sup> Faces have *configural properties* (e.g. the distance between features and their placement relative to each other), as well as *featural properties* (e.g. eyes, nose, mouth) and *surface information* (e.g. skin texture, pigmentation, eye color).<sup>25</sup> The major areas involved in discriminating one face from another are the fusiform area and the inferior occipital gyrus<sup>25</sup> but the entire occipital-temporal network is involved.<sup>26</sup>



**Figure 4. The Librarian (c 1560s) by Giuseppe Arcimboldo (1527-1593)**

A face, though, is perceived holistically, i.e., as an “amalgamation” and “not as a collection of discrete features.”<sup>25</sup> “The ‘whole face’ emerges from its individual parts...the whole is *truly* greater than the sum of its parts.”<sup>25</sup> Faces have become so important in identifying people that facial recognition software occasionally supplants the use of fingerprinting in security systems and disaster victim identification.<sup>27</sup> Even the iPhone X uses facial recognition technology for its activation.<sup>28</sup> Considerable social information, such as gender, age, attractiveness, mood,<sup>26</sup> and even trustworthiness<sup>29</sup> can be “extracted” from faces.<sup>30</sup> Typically, though, people have difficulty identifying inverted faces<sup>24,25</sup> and those from another race with whom they have had infrequent contact.<sup>18,25,30,31</sup>

Recent investigations suggest that facial recognition involves an elaborate *face-patch network*—multiple cortical areas specialized for face processing.<sup>30,32</sup> Functional MRI scans of rhesus monkeys have detected two face areas located in the anterior temporal lobe involved in *familiar* face recognition—the perirhinal cortex and the temporal pole—the *extended temporal network*, of the previously known *core face processing system*. Whether these deep temporal regions are implicated in human familiar face recognition is not yet established.<sup>33</sup>

Faces lack *familiarity*<sup>34</sup> for those with **prosopagnosia**; facial recognition, i.e., that sense of *re-knowing*, does not come effortlessly. The condition can be *developmental*, with a possible genetic connection,<sup>26,35,36</sup> or can be *acquired* by lesions in the right visual association cortex, with nearly always damage to the fusiform gyrus.<sup>3</sup>

Developmental **prosopagnosia** (DP) refers to the absence of any *known* lesion, brain injury, intellectual or visual impairment, or other neurological condition that could account for the impairment of facial recognition.<sup>26,37,38</sup> Considered a neurodevelopmental disorder,<sup>26</sup> it is a defect in face memory. The inability to recognize faces has been described as a “disconnection phenomenon,”<sup>26</sup> where defects are the result of “damaged links between stored visual representations of

familiar individuals and associated semantic memory traces.”<sup>26</sup> Rather than associated with meaning, many faces for those with **prosopagnosia** are “meaningless.”<sup>39</sup> For some researchers, though, DP is a “statistical phenomenon,” i.e., “the deficient end of a normal distribution”<sup>40</sup> rather than pathology specifically, with a continuum from super-recognizers who never forget a face<sup>41</sup> to those with considerable difficulty in recognition.

Initially considered rare, developmental **prosopagnosia**<sup>35,42,43</sup> is now believed to occur in 2 to 3% of the general population.<sup>38,42</sup> The condition may go undetected for years. Those afflicted may have “minimal to moderate insight”<sup>13</sup> into their difficulties and may not appreciate the extent to which they fail to recognize faces, differentiate among unknown faces, or even know whether two faces are identical, especially without a means of comparison with “normal face processing skills.”<sup>44</sup> Only years later, with increased social demands in adulthood, does it become apparent and become a potential trigger for social anxiety.<sup>13,26,42,44</sup> Those afflicted learn to use “trial-and-error alternative strategies,”<sup>37</sup> as I have done, albeit not always successfully, including observing other distinguishing features such as hair, gait, height, voice, clothing, or glasses.<sup>3,44</sup>

Further, DP is quite a heterogeneous condition of varying severity.<sup>38,40,44</sup> Currently, there are no officially established diagnostic criteria for DP<sup>26</sup> though there are several tests, including the Cambridge Face Memory Test (CFMT) that can assess failure to recognize a “diet of faces”<sup>38</sup> in the context of *self-report acknowledgment* of everyday face recognition difficulties.<sup>13,38</sup> When people have moderate difficulty, they can learn to recognize celebrities and family members after *repeated* exposure<sup>3</sup> but they may often have, as I describe, difficulty distinguishing among characters at the beginning of a film or TV program.<sup>38</sup> If severe enough, some cannot recognize family members, good friends, or even themselves in a mirror.<sup>40,45</sup> Sometimes the disorder affects processing and differentiating among other objects, such as bicycles, cars, or houses, or even presents with severe navigational difficulties.<sup>38</sup> There is no widely accepted treatment.<sup>37,44</sup>

The defect, though, has “extraordinary specificity.”<sup>46</sup> Certain aspects of face processing and perception, such as face detection, remain intact,<sup>26</sup> as does the ability to identify a person’s emotions from facial expressions.<sup>26,44</sup>

“Once a face is perceived, it is difficult not to see it”<sup>47</sup> or to decide not to recognize it.<sup>48</sup> With **prosopagnosia**, we clearly perceive a face as a face but struggle to make the memory connections of recognition that other people make so automatically, reliably, and immediately.<sup>49</sup> Since the condition is not necessarily apparent, others may interpret our behavior erroneously, and we may inadvertently provoke the offended feelings that non-recognition engenders. The challenge for physicians is to be cognizant of invisible conditions that have psychological impact and embarrassing consequences not only for those who suffer from **prosopagnosia** but also for those whom they encounter and fail to recognize.



**Figure 5. Detail from Deux Hommes en Pied (c 1862) by Edgar Degas (1834-1917), Musée d'Art Moderne, Troyes (France)**

## Image Credit

Fig 1. *Chuck Close, Self-Portrait* (1997). (Museum of Modern Art, New York City). American artist Chuck Close (born 1940) has written of his own **prosopagnosia**; instead of using three-dimensional models, he works from two-dimensional photographs. Source: Copyright, Chuck Close, courtesy of Pace Gallery (New York City)(Used with permission obtained from Pace Gallery, 5/8/2017, who sent me the image)

Fig 2. *Electrical Outlets* (2000) *Pareidolia* is the common illusion of seeing faces wherever there is an eye, nose, mouth configuration. Babies as young as 8 months and non-human primates recognize these configurations, as do those with **prosopagnosia**. Source: photograph by François Robert, from his book *Faces* (Robert and Robert, Chronicle Books, 2000)(Used with permission obtained from photographer François Robert, who owns the photo and sent me a copy of the image 6/13/2017)

Fig 3. *The Waiter* (1574) by Giuseppe Arcimboldo (1527-1593) Even those with **prosopagnosia** are able to see a face amidst the household objects of an Arcimboldo painting. Source: Private collection, Web Gallery of Art, Wikipedia.org/ Public

Domain. [https://en.wikipedia.org/wiki/Giuseppe\\_Arcimboldo#/media/File:Giuseppe\\_Arcimboldo\\_-\\_The\\_Waiter\\_-\\_WGA0835.jpg](https://en.wikipedia.org/wiki/Giuseppe_Arcimboldo#/media/File:Giuseppe_Arcimboldo_-_The_Waiter_-_WGA0835.jpg) (retrieved online, 9/28/2017)

Fig 4. *The Librarian* (c 1560s) by Giuseppe Arcimboldo (1527-1593) Source: Skokloster Castle, Sweden, Wikipedia.org/Public

Domain [https://en.wikipedia.org/wiki/Giuseppe\\_Arcimboldo#/media/File:Bibliotekarien\\_konserverad\\_-\\_Skoklosters\\_slott\\_-\\_97136.tif](https://en.wikipedia.org/wiki/Giuseppe_Arcimboldo#/media/File:Bibliotekarien_konserverad_-_Skoklosters_slott_-_97136.tif) (retrieved online, 10/2/2017)

Fig 5. Detail from *Deux Hommes en Pied* (c 1862) by Edgar Degas (1834-1917), Musée d'Art Moderne, Troyes (France) Those with **prosopagnosia**, i.e. face blindness, are not able to remember faces. Faces become meaningless and blank as depicted by French artist Edgar Degas. Source. Used with permission from the Conservation des Musées (M. Kaspeszczuk, Musée de Troyes, France) (permission obtained 6/16/2017)

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**SYLVIA R. KARASU**, MD, is a Clinical Professor of Psychiatry at Weill Cornell Medicine and a member of the Institutional Review Board of The Rockefeller University. The senior author of *The Art of Marriage Maintenance* (2005) and the textbook *The Gravity of Weight* (2010), Dr. Karasu is a *cum laude* graduate of the University of Pennsylvania and has her medical degree from Einstein College of Medicine. She is a Distinguished Life Fellow of the American Psychiatric Association, graduate of the New York Psychoanalytic Institute, elected Fellow of the New York Academy of Medicine, and in private psychiatric practice in NYC.

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