Q1

The sculpture consists of a single lump of homogeneous material yet we perceive the face of *Pardanasheen* Rebecca different from the overlying fabric. My best guess is that there are several depth, transparency and causal cues at play.

Within depth perception, we briefly discussed some monocular cues, such as edge interpretations, gradient textures etc.

Edge interpretations:

Nakayama et. al. briefly describe T junctions as clues to depth and occlusion when talking about amodal completion. In the below image, it is concluded that due to the presence of T junction, we see region x in the foreground occluding regions y and z which are connected in the background. Similar x,y,z regions can also be assigned to the lips and the crease of the veil. Where follwing similar rules as described by Nakayama et. al, the veil gives the perception of being in the foreground while the occluded portion of the lips connects in the background giving a sense of depth perception. Here although I have highlighted just one T junction, similar junctions can be seen throughout, for example nose, eyes etc instead of the lips.

(I have used the photograph of "The Veiled Virgin" by Giovanni Strazza due to better image quality)

Atmospheric transfer function and transparent haze:

While discussing lightness perception and lightness lightness illusions, we disccued the atmospheric transfer function
$L = mR + e$

where L and R are luminance and reflectance, m is a multiplier on the reflectance, and e is an additive source of light. The shift in intercept caused by e in luminance gives the effect of a transparent haze on the image.
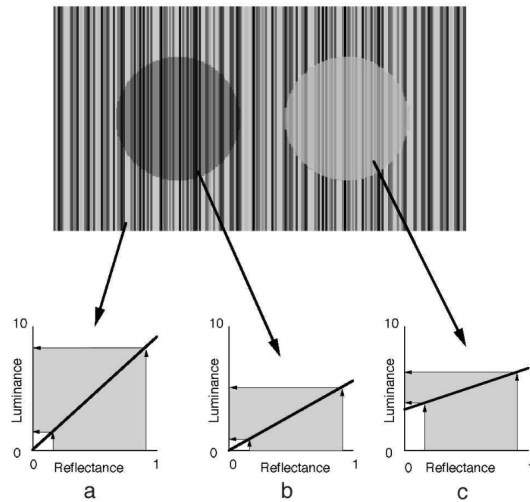
Here as well we see that, below the neck, the luminance is increased and it appears as if there is a denser 'transparent haze' or put into better terms, more layers of fabric, while the low luminance of the face suggests thinner more shear and lesser layers of overlying fabric. The difference in the luminance at different regions might gives a pronounced effect of a transparent material that due the creases and folds appears as a veil to us.

Causal effects:

We are familiar with cloth, and can identify tell-tale signatures of its typical behavior when it freely self-organizes under ambient ecological effects, such as gravity, while deviations from typical shape features are likely caused by a hidden object. Drapery exhibits distinctive geometrical features, and even though an observer is unlikely to have not seen a given specific configuration of folds or creases before, as an ensemble, they allow the observer to recognize cloth. Some features of the shape of the cloth that do not conform to familiar types of ridge and fold structures could thereby be identified as outliers that likely have a separate cause, i.e., a hidden object that interrupts the cloth's natural flow.

Concavity and Contact Points:

A possible source of information about which regions of cloth are in contact with an underlying surface is that a positive or negative Gaussian curvature (convex and concave) suggests contact with an underlying surface, whereas those with zero Gaussian curvature (plane) are likely to be suspended in air without any surface contact. The authors also argue that the sculpture isn't designed with the idea of an actual real life replication of a suspended veil primarily to give concave and convex contact cues to the observer

References:

1. Ken Nakayama, Zijiang J. He, and Shinsuke Shimojo : "Visual Surface Representation: A Critical Link between Lower-level and Higher-level Vision"

2. Edward H. Adhelson : "Lightness Perception and Lightness Illusions"

3. James Todd : "Perceiving transparency from opaque surface materials"