Some speculations on the ethological basis of agonistic signaling with the eyes.

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Within ethology, an agonistic situation is a face-to-face competitive encounter. In such cases giving the appropriate signals at the appropriate time crucially affects the well-being of the participants. Prior work has given an account of the vocal and some facial signals involving the mouth in agonistic encounters (Morton 1977, Ohala 1984, 1996). But as has often been noticed, there are gestures involving the eyes that are commonly found in agonistic signaling and these have cross-species incidence (Darwin 1872, p 179 ff). Threat is signaled by narrow eyes and lowered brow; submission or non-threat by wide eyes and raised eyebrow. (Excluded here are staring eyes.) In general, it seems that wide eyes and anything that can convey an impression of wide eyes, including the raised eyebrows, cosmetics that better defines the edge of the eyes (e.g., mascara), and large-rimmed eyeglasses, give the owner an attractive, non-threatening appearance. Why? I speculate that this arises from the fact that infants and juveniles – inherently non-threatening since they lack maturity and potency – have large ratios of eye-to-head dimensions. There is a fundamental biological reason for this. Although most anatomical parts of the infant are small with respect to the size they will eventually grow to, this is less so in the case with the eyes. There is less growth of the eyes and the orbit within the skull in comparison to other anatomical features, including the overall size of the skull, its anterior-posterior dimension, and especially the crown to mandible dimension. Even though the flexibility in the eyes' lenses is maximal for infants, there are limits to its flexibility. (In comparison, consider teeth which also have limits on growth: they are suitably small for a small mandible but rather than retain the small teeth as the individual's mandible continues to grow, the biological strategy is the replace those teeth with larger ones at approximately age 6~7. This strategy would have serious adverse consequences if applied to the lens of the eye.) The consequence of all this is that faces that more closely approximate those of the young elicit an apparently innate favorable response and the signaler exploits this by the plastic and cosmetic modifications of the eyes. It has to be allowed, of course, that the eyebrows and eyeglasses' rims are not the real edges of the eyes but it is reasonable to suppose that they give an impression of eye size.

References

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