



Research Letter from England on Smiling Corpses

To Smile Or Not To Smile

By our corresponding author, Grinning 'Bulldog' Smith

What's in a grin? Or a scowl or a frown, for that matter? Whereas most humans have two arms, two legs and a belly button, it seems that we don't all share exactly the same repertoire of facial muscles. Perhaps this might explain some of the odd looks from lab colleagues when telling subtly hysterical jokes – it may not be due to an absence of humour but rather to deficits in their underlying anatomy!

At least, this is the essence of Bridget Waller's recent paper, "Selection for Universal Facial Emotion", published in the journal, *Emotion* (2008, vol.8, p. 435-439). Waller, from the Centre for the Study of Emotion at the Department of Psychology in the UK's University of Portsmouth, has previously compared the smiles of her lab colleagues with those of chimpanzees; however, in this latest study she has now refined her analysis to consider underlying differences in the frozen glassy-eyed stare of human corpses.

Some observers might be surprised to find that such a "systematic study" only fills four and a half pages, but then they might be even more surprised to learn that it is based on the analysis of no more than 18 dead faces – and rather elderly ones at that. The 18 "adult human cadavers" (11 females and 7 males) were "61-100 years old" and came from the Slippery Rock and Dusquesne Universities in the USA. Described as "Caucasian Americans", the Methods section casually notes that they were "part of gross anatomy courses" at these institutions, an observation that takes on greater significance when analysing the data in the ensuing Results section.

Here, in a table presenting the entire study data, we are shown the "Individual variations in facial muscle presence and asymmetry" for the 18 corpses, listing the presence or absence of 15 muscles and differences in their dimensions on the left and right sides of the face. In addition to these symbols, there are also a number of intriguing question marks ("?") but we are enlightened by a footnote: "? = unable to discern because of previous dissection". Yes, incredible as it may seem for such a "systematic" anatomical survey, Waller and her co-authors were not the first experimenters to get to work on these faces!

A matter of muscles

Waller makes no other mention of the prior dissection of her experimental subjects in her paper. Indeed, one might wonder if she really thought through the implications – how easy is it to analyse muscles adjacent to those no longer discernible due to previous dissections? In fact, the Results section is only 22 lines long, which makes it all the more surprising to read in the press release that Waller says, "Everyone communicates using a set of common signals and so we would expect to find that

the muscles do not vary among individuals. The results are surprising – in some individuals we found only 60 per cent of the available muscles"! But in what state were these muscle-deprived individuals? Not wishing to bring my grandmother into this, but have you seen the facial tonus of an 85-year-old? One might equally wonder just how easy it is to distinguish superficial muscle differences in such, well, saggy tissue.

Dissecting the already dissected

One of the anatomists on the study and a co-author on the paper, Anne Burrows, from Dusquesne University, is even quoted as explaining that, "the problems with quantifying facial musculature is that they're not like other muscles. They're fairly flat, difficult to separate from surrounding connective tissue and they all attach to one another. They are very unlike muscles of the limb, for example." This is hardly reassuring news.

Luckily, all the dissections and analysis were performed by the third author, James Cray (from the University of Pittsburgh), who, "had no knowledge of the hypothesis being tested in this study and, thus, had no bias in gathering the gross size data". Nevertheless, the faces of at least seven of the 18 corpses had already been partially dissected by someone else who presumably, in addition to not knowing anything about the hypothesis, couldn't have foreseen that, subsequently, there would be a detailed analysis on the facial muscles of these corpses.

The paper's Figure 1 provides a helpful sketch showing the relative positions on the face of 16 facial muscles. From this labelled diagram, one can readily deduce that all the "?" muscles come from around

the mouth. Unfortunately, most of the other studied muscles are also anchored around the mouth! Coincidentally, most of the "absent" facial muscles listed in the Results table also come from these pre-dissected corpses.

Hardly the substance for a "systematic study into the variations of muscles in the human face"! Especially when there are previous studies, such as that by Shimada and Gasser (*Clinical Anatomy*, 1988), that looked at "variations in the facial muscles at the angle of the mouth" in 147 Japanese corpses "or more precisely 279 sides" (don't ask me what happened to the other 15 "sides"!). Besides, why keep looking at corpses when so many living persons have parts of their perfectly healthy faces opened up for cosmetic surgery? A study by a Goodmurphy (*Clinical Anatomy*, 1999) looked in detail at large quantities of two of the facial muscles "which were procured as biopsy material from cosmetic surgery procedures".

To quote the title of a newspaper article in the UK's *Daily Telegraph* reporting Waller's study, "Missing facial muscles make some look glum."

