

# It's not what you Perceive it's the way that you Perceive it: Reflections on the Relationship Between Perceptual Appearance and Perceptual Aesthetics

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## EXTENDED ABSTRACT

For some time we have been interested in the measurement of visual appearance in medical applications. My previous presentations at CIE Expert Symposia have focused on the measurement and characterisation of dental fluorosis (i.e. white mottling on the teeth caused by the ingestion of too much fluoride in childhood) and post-surgical facial scarring ([1], [2]). In this presentation, however, I wish to broaden the focus to include other work from my laboratory on emotional aspects of colour processing and perceptual processing in autism. The issue I wish to address is the importance of verbal descriptions of our perceptions in understanding how to solve a variety of puzzles in perception, and how we might take this idea further in future research.

Beginning with the work on fluorosis, the specific remit was to solve a practical problem: to what extent are teenagers bothered by having dental fluorosis? Previous research in public health dentistry had suggested that the white mottling on the teeth which can result from mild fluorosis was actually *desirable* to some teenagers because it made their teeth look whiter and more “sparkly”. We addressed this question by producing digital simulations of different levels of fluorosis and embedding these simulations into a web-site. The key question we asked our (teenage) participants was: Is this appearance *acceptable* or not? Unsurprisingly, ratings of acceptability decreased with increasing fluorosis level, although this dependence went away at longer viewing distances (corresponding approximately to conversational distance). However, there was a strong baseline *lack of tolerance* for seeing anybody's teeth close-up which was problematic for our measurements.

With the work on post-surgical facial scarring again the remit was a practical one: to quantify the difference in colour between scar and surrounding skin. Here again, we ran into difficult issues having collected the data. Scars are by no means homogeneously or consistently coloured and differ from surrounding skin in much more than just their colour. Another issue was that whilst individuals have no problem identifying the presence and extent of a scar it is much harder to do that in a meaningful way objectively. We were forced, therefore, into combining colour with texture measurement in order to attempt to characterise the scars automatically and also using panels of observers to draw around the scars on a touch screen to give us some idea of “ground truth” for our measurements. This work illustrates the usefulness of *consensus coding* in visual appearance research. In essence, the relevant adjective to describe our stimuli was “scarriness”, which refers to that combination of texture, colour and 3D shape that we call scarring. However, in additional experiments we also asked participants to describe the scars in their own words. Whilst many colour, texture and 3D shape

descriptors were used, other words like “delicate” and “tender” refer to more empathic possibilities, closer to the CIE's idea of “total” visual appearance ([3]).

This leads us onto aesthetic aspects of visual perception. There is a growing body of literature on the aesthetic aspects of colour perception (see, [4]), which is beginning to be extended into visual appearance qualities such as texture (e.g. [5]). Participants have no difficulty in specifying not only what their “most preferred” colour is, but also which they find most *pleasant, unpleasant, lively* or *calming*. There is also a surprising consensus on which colours make us feel *happy* and *sad*. This fascinating area of research is also beginning to look carefully at individual differences, especially those between males and females, different cultures and different age groups. These groups can differ not only in what their responses are, but also in how much they are influenced by suggestion and prior exposure.

Individuals on the autism spectrum have unusually strong sensory preferences ([6]). Indeed we have found that not only individuals with diagnoses of autism spectrum disorder (ASD) but also those with higher levels of autistic personality traits demonstrate marked differences in their responses to environmental sensory stimulation than those with few such traits. These difficulties can make some types of sensory stimulation intolerable. Whilst the list of stressors includes obvious things like flickering lights, fire alarms and chemical smells, these can also be such apparently innocuous things as brightly coloured objects, brushing past somebody in a supermarket and the smells of everyday foods.

This survey of research might suggest that the idea of predicting perceptual responses is a hopeless task, complicated as it appears to be by the presence of these large individual differences. I would like to argue that a combination of careful characterisation of participant groups, using demographic data and personality questionnaires, and careful attention to the words people use to describe their sensory experiences, at least in the first instance, will lead to a greater ability to move forward in this field and thereby establish at least what the “average human” response will be in representative situations.

## REFERENCES

- [1] SIMMONS, D.R. *et al.* Visual Appearance: Applications in public health dentistry and maxillo-facial surgery. CIE x032:2007, 114-122.
- [2] SIMMONS, D.R., TAWDE, S. & AYOUB, A.F. What is a facial scar? *Proceedings of The 2nd CIE Expert Symposium on Appearance: When Appearance meets lighting ... Gent, Belgium, 8-10 September, 2010.*
- [3] CIE 175:2006 *A framework for the measurement of visual appearance.*
- [4] SIMMONS, D.R. Colour and Emotion. In: *New Directions in Colour Studies* Eds. Biggam, C.P., Hough, C.A., Kay, C.J. & Simmons, D.R. Amsterdam, The Netherlands: John Benjamins, 2011.
- [5] SIMMONS, D.R. & RUSSELL, C. Visual texture affects the perceived unpleasantness of colours. *Perception*, 2008, **37** (supplement), 146
- [6] SIMMONS, D.R. *et al.* Vision in autism spectrum disorders. *Vision Research*, 2009, 2705-2739.