Synopsis of Original Research Paper

Modelling facial makeup by statistical image analysis

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Millions of people wear cosmetic makeup every day to make their faces look more attractive, feminine, and healthier. Accumulated evidence from research indicates that several cosmetic practices accentuate perceived femininity and attractiveness. However, the quantitative link between facial appearance modification through cosmetic makeup and perceived facial impressions remains unclear. This study aimed to build a mathematical model of Japanese women's everyday facial makeup using a statistical image quantification technique (Study 1). In addition, it sought to identify psychological factors underlying the cosmetic effect on facial attractiveness (Study 2). In Study 1, 16 Japanese women's faces were photographed before and after applying facial makeup. The facial images were analyzed using principal component analysis to quantify the change in the facial surface associated with the cosmetics. The statistical image quantification enabled visualization of facial appearance linked to makeup. It revealed that cosmetics exaggerated the luminance contrasts between facial parts (i.e., eyes, eyebrows, and lips) and surrounding facial areas. The validation test confirmed that perceived attractiveness, health, and naturalness were curvilinearly changed due to the facial makeup exaggeration. Study 2 demonstrated a sex difference in the luminance contrast of facial parts (53 women and 54 men), suggesting these traits are sexually dimorphic. The results indicated that widely used cosmetic makeup among Japanese women accentuates facial features that signal femininity and youthfulness by heightening the luminance contrasts of facial parts.