INTEREST OF GLOBAL EVALUATION ACNE (GEA) SCALE ON FACIAL PHOTOGRAPHS FOR DIFFERENT ETHNICITIES

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INTRODUCTION

The GEA scale is widely used to diagnose acne severity for Caucasian skin in Europe. The GEA scale has been validated for face-to-face and photo evaluations[1]. The main objective of this study was to assess the suitability of GEA scale for acne severity diagnosis on smartphone images for Black African and Asian (Chinese) ethnicities compared to Caucasians.

MATERIALS AND METHODS

Images from the face, as well as from right and left profiles of 1,008 acne patients (571 Caucasian, 294 Black African and 143 Chinese), having signed an informed consent were to be collected in France (35%), South Africa (50%) and China (15%).


All patients had to have different acne severity grades and images were taken using, if possible, two smartphones equipped with IOS or Android system.

	Males	Females	Age+/-EC	Min	Max	IOS	AN	GEA 0	GEA 1	GEA 2	GEA 3	GEA 4	GEA 5
Caucasian	32%	67%	24.1+/-9.0	11	57	1430	1537	42	248	160	106	13	2
African	36%	64%	22.2+/-8.2	10	54	882	882	7	125	129	32	1	
Asian	30%	70%	28.0+/-11.7	11	58	429	429	6	67	47	22	1	
Total	33%	67%	24.1+/- 9,4	10	58	2741	2848	55	440	336	160	15	2

Three trained dermatologists with an expertise in acne graduated each patient acne severity with the European GEA scale[1] using the three images views taken with both IOS and Android systems.

Inter and intra-rater reproducibility was checked using Krippendorff's alpha and Cohen's kappa statistical tests[2]. For intra-rater reproducibility, a comparison between evaluations obtained from IOS and Android images was used.
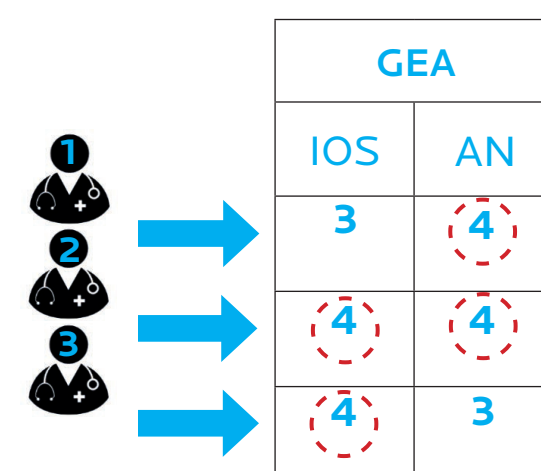

Krippendorff's Alpha - Cohen's Kappa

Values	Interpretation
Smaller than 0.00	Poor agreement
0.00 to 0.20	Slight agreement
0.21 to 0.40	Fair agreement
0.41 to 0.60	Moderate agreement
0.61 to 0.80	Substantial agreement
0.81 to 1.00	Almost perfect agreement

RESULTS

There was a substantial intra-rater reproducibility for all ethnicities and all dermatologists (Cohen's Kappa from 0.65 to 0.84, p<0.0001). The best agreement among the three evaluators was obtained for Black African subjects for IOS images ("substantial" - Krippendorff's alpha = 0.69, p<0.0001) and the lower agreement for Chinese subjects on Android images ("fair" - Krippendorff's alpha = 0.38, p<0.0001). This last result is perhaps linked to the lower number of Asian patients included in this evaluation.
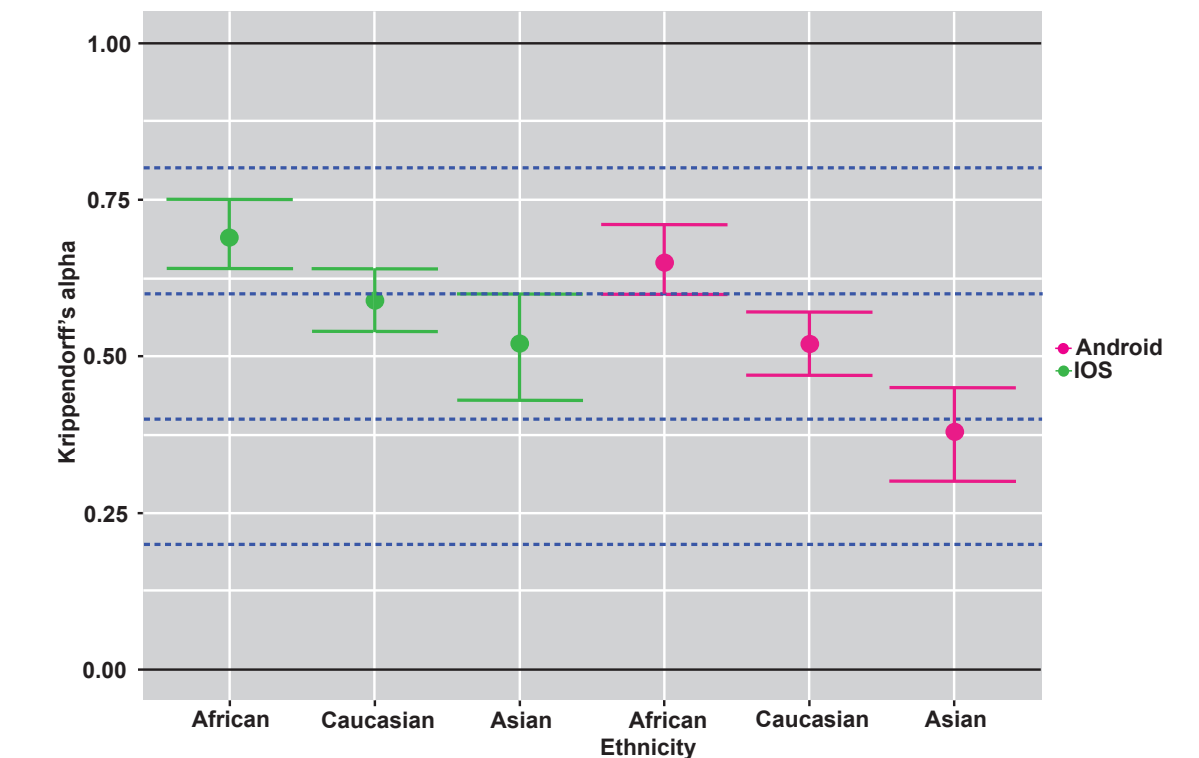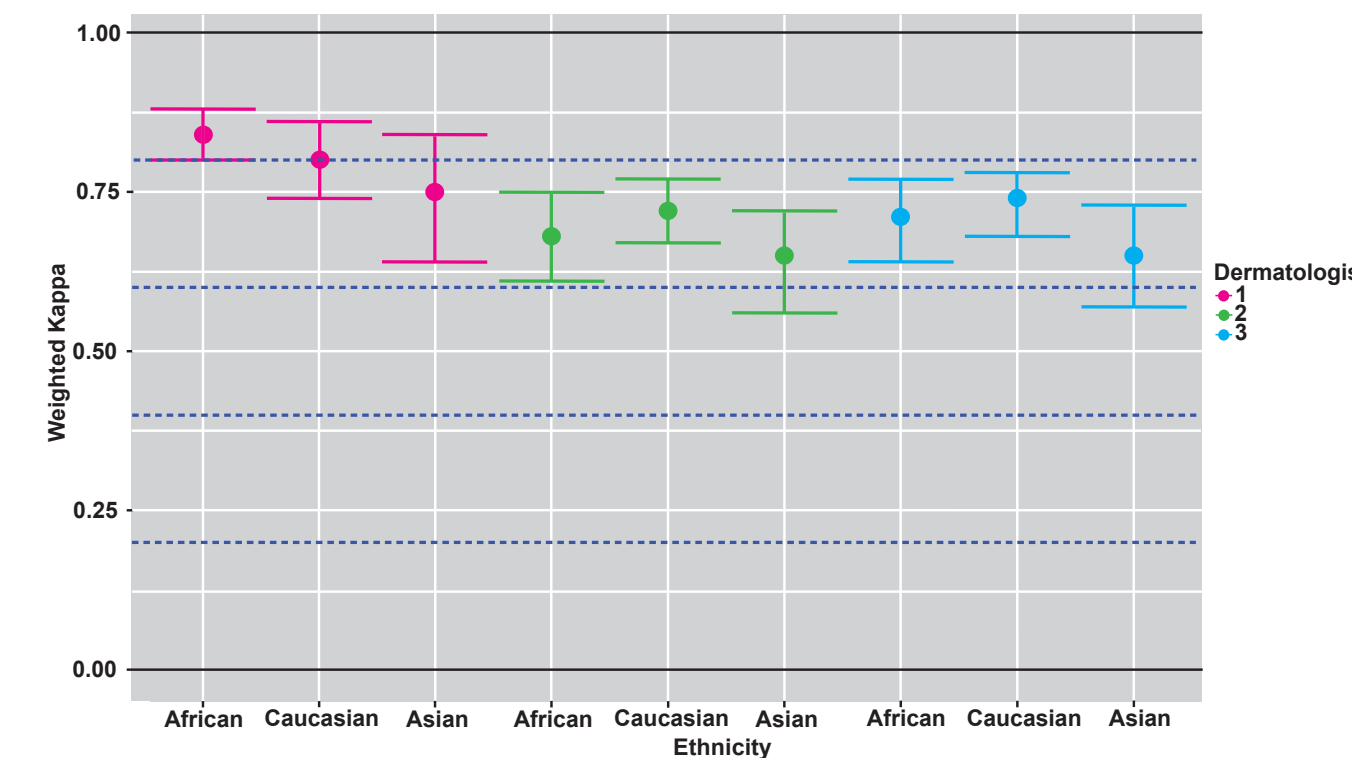
The agreement (Krippendorff's alpha) depends on the type of device. It seems that even if both IOS and Android systems have the same camera quality, the color rendition has an influence on acne severity assessment.

Android   IOS
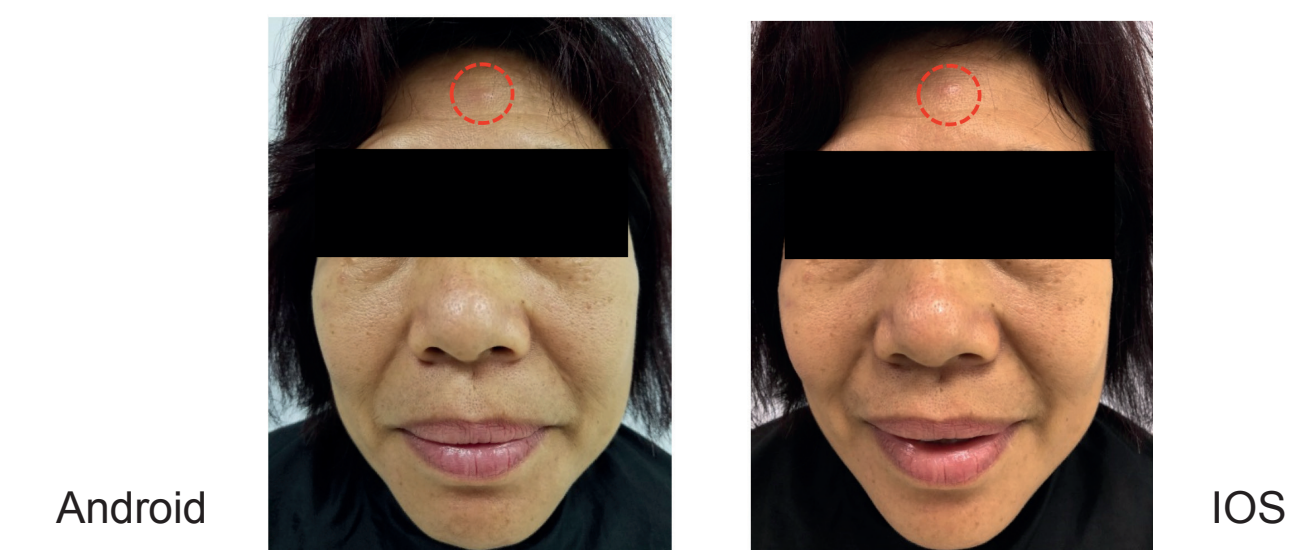
CONCLUSION

Our study demonstrates that the assessment of acne severity on digital photos using GEA scale is also possible for Black African and Asian (Chinese) ethnicities.

REFERENCES

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