

Hold and Influence on Attractiveness of Decorative Cosmetics Determined by Subjective Rating and Image Analysis

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Introduction

Since prehistoric ages and early cultures, women have decorated their faces and bodies to improve their appearance and for expressing their social status. Nowadays, decorative cosmetics are more and more refined. Recently, it was shown that their use leads to an improvement in the quality of life of the users. Products like mascara, make-up and lipsticks are promoted with long-lasting claims, covering powers and attractiveness claims. To be able to substantiate such claims, we have developed a standardized evaluation of clinical photographs by either lay person rating or image analysis.

Material & Methods

Ranking or scoring of highly standardized facial photographs is the method of choice to assess the parameters mentioned above. A blinded presentation of pairs of photographs of the subjects in which everything is kept identical except for the treatment effect enables a very sensitive scientific proof of cosmetic effects on parameters like attractiveness and long-lasting claims. The clinical photography set-up provides optimum repositioning and high color reproducibility so that the obtained images can be perfectly assessed or analyzed.

To evaluate the time-dependant depletion of cosmetic products, different types of make-up products, make-up and lipstick were applied by a beautician to the faces of 12 female subjects (aged between 19 and 39 years), the mascara products were applied by the subjects themselves (Figure 1). Before application, after 10 minutes, as well as 1, 3, and 6 hours after application clinical photos were taken from the subjects' faces.

The images were rated by 6 trained experts and by the 12 subjects themselves (n=18) on defined parameters to assess the hold of the products over the investigated period of time. Additionally, color image analysis was performed after transforming the color of each pixel to CIE L*a*b*. The covering power of lipstick and lipgloss were assessed by redness a*. The variability of yellowish color b* was used to assess the covering power of the make up.

Results and discussion

Results showed that both low priced lipgloss and higher priced lipstick faded in color intensity during the six hours assessment time after application (Figure 2). As a result of image analysis, the lipgloss had a lower covering power than lipstick (Figure 2 B, lower chart). The main color fade occurred during the first three hours while during the following three hours, color decreased further only slightly (Figure 2 B).

Over the complete assessment time, a clear difference between the covering power of lipgloss and lipstick was seen with a clearly better hold of the lipstick product. Rating data correlated to the data of image color analysis (Figure 2 B upper to lower chart). Correspondingly, the rating data relating to make-up and tinted daycream showed the main decrease of covering power in the first three hours after the product application. During the following three hours, only a slight decrease of the covering effect was seen (Figure 3 B). The results of the image color analysis was superior to the visual rating. It was possible to show clear differences for the covering power between both products directly after the application compared to the untreated skin as a control (Figure 3 B, right panel). The make-up showed a higher covering power than the tinted daycream. However the decrease rate of covering power was comparable for the low-priced tinted daycream and the high-priced make-up product as observed in both, rating and image color analysis (Figure 3 B, left and right panel).

A bias was observed in the subjective ratings. The first decrease in the subjective assessment is attributed to the procedure of presenting the images to the raters, because this procedure implicated the assumption that there should have been a difference between the images. Due to this implication in mind, the raters did never rate 100%.

It was seen that the use of the decorative cosmetics had a clearly positive effect on the perceived attractiveness compared to untreated (Figure 4). During the six hours after the product application, a clear decrease of attractiveness was observed. The loss of attractiveness over time even outperformed the loss of color in the faces. The depletion of lip color correlated best with the decrease of attractiveness,

Conclusion

We conclude that the hold and long-lasting claim of decorative cosmetics can be determined in a reproducible way by subjective rating and objective image analysis of high-quality clinical photos, when they are presented in a blinded way and as a direct comparison of times or treatments.

The lipstick influenced the rating in the described study the most. In other studies, we have seen that even unobtrusive eye make-up can be the driving aspect if all other make-up components remain the same (data not shown).

Therefore, rating of attractiveness was mainly driven by that type of product that increased the contrasts of the facial expression at most.

Scientific assessment of parameters which are correlated to attractiveness like radiance, fresher or younger look is gaining increased importance in the cosmetic industry and with the described method, we can determine product effects on facial attractiveness parameters objectively and subjectively.



Figure 1: Clinical photography before (center image) and after (right and left image) application of two different sets of decorative cosmetics [Set 1 (low priced): Mascara, tinted day cream, lip gloss, Set 2 (high priced): Mascara, cream make-up, lip stick].

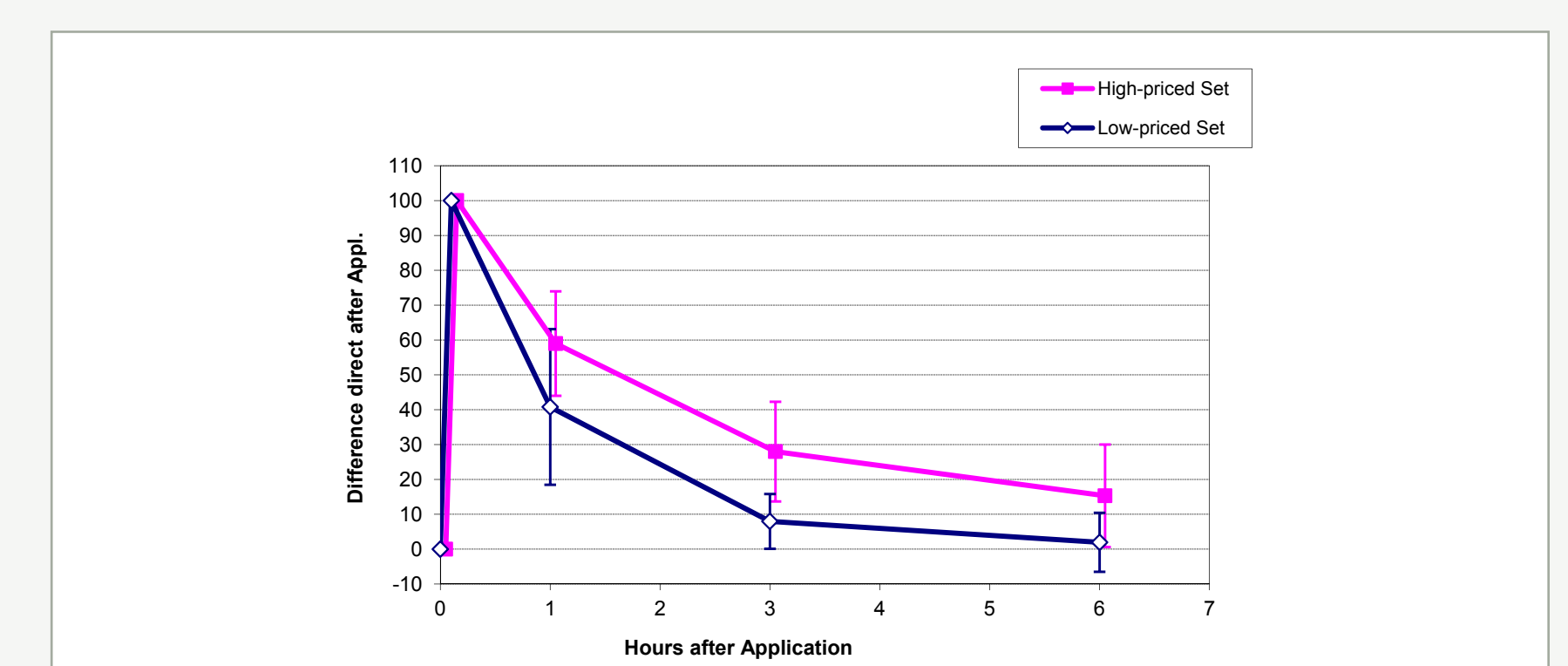


Figure 4: Visual assessment of attractiveness. Attractiveness on pairs of images as displayed in Figure 1 fades quite pronounced during the first 3h after application.

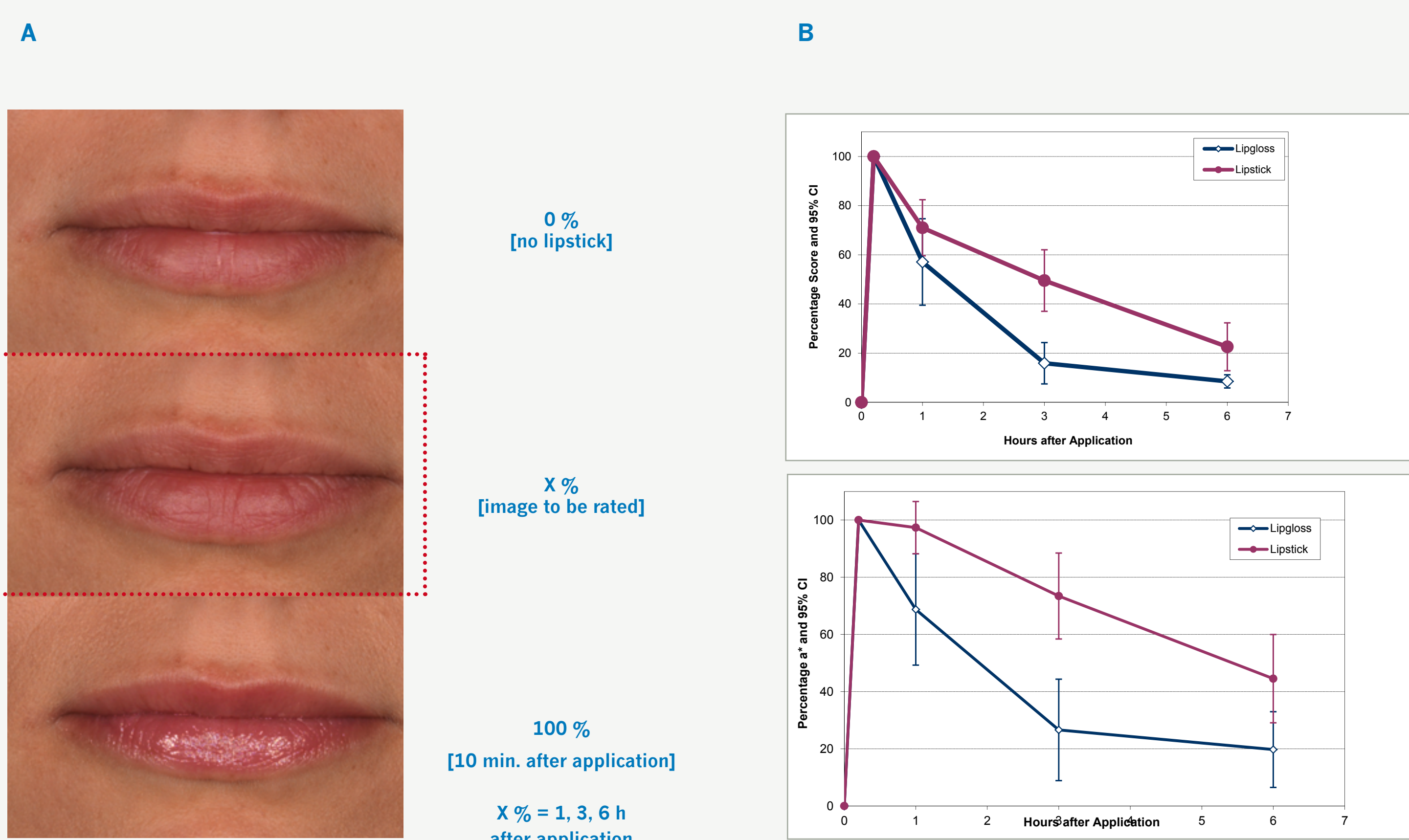


Figure 2: (A) Assessment of lipstick (covering power and shine) by the raters. No covering power (0%) is seen when no products are applied. Highest covering power is seen after 10 minutes (100 %). (B) Comparison of subjective (upper chart) and objective (lower chart) assessment of lasting of lipstick/lip gloss.

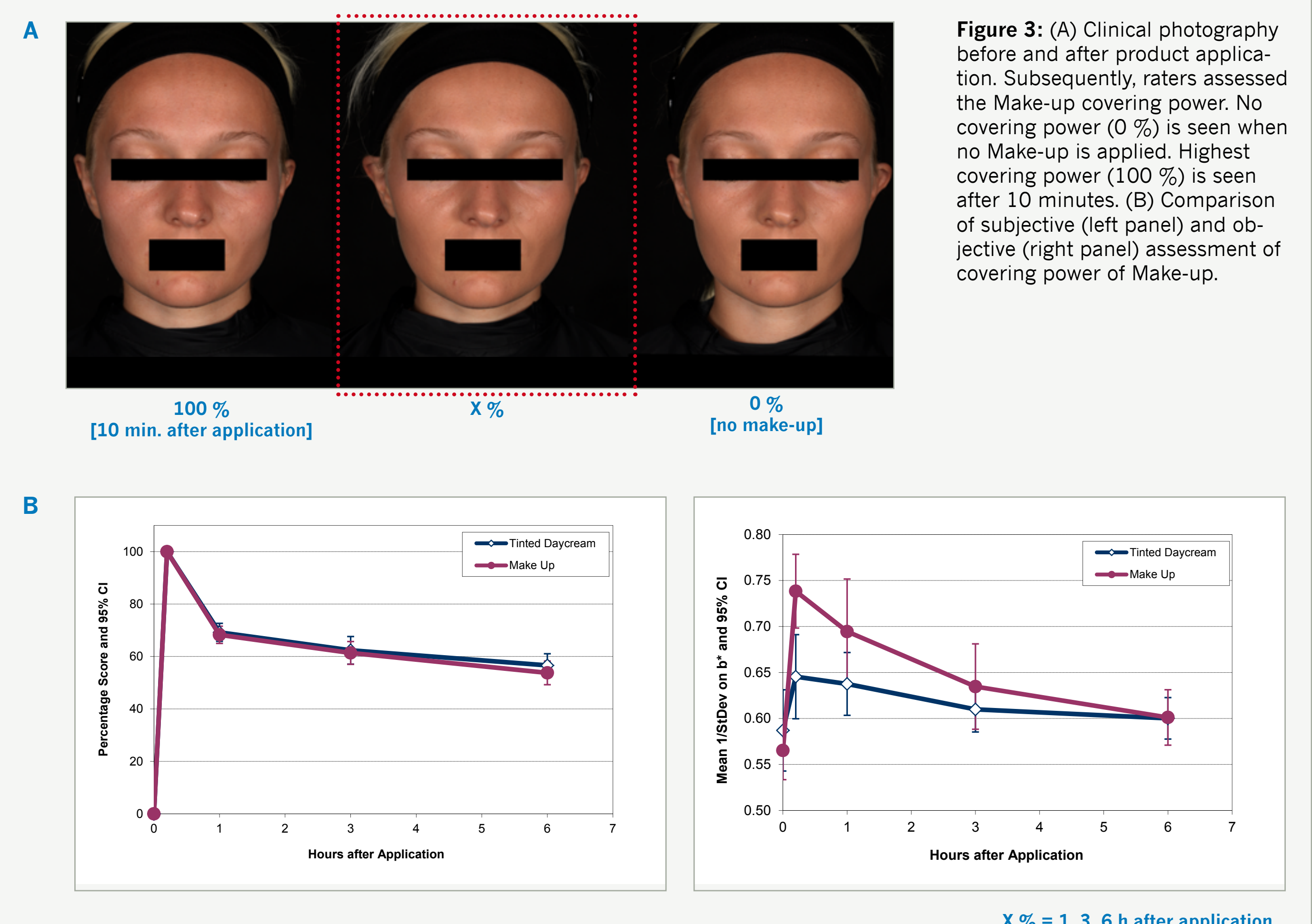


Figure 3: (A) Clinical photography before and after product application. Subsequently, raters assessed the Make-up covering power. No covering power (0 %) is seen when no Make-up is applied. Highest covering power (100 %) is seen after 10 minutes. (B) Comparison of subjective (left panel) and objective (right panel) assessment of covering power of Make-up.

X % = 1, 3, 6 h after application