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A MULTI-DIMENSIONAL APPROACH FOR HOLISTIC APPRAISAL OF PRODUCTS ACTING ON WELL-BEING

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1. Introduction

It is well known that skincare products can promote well-being. However, this impact is very difficult to determine objectively, as well-being is not only a highly subjective concept but also a highly complex one encompassing various dimensions (e.g., internal psychophysiological activations, positive emotional valence, specific thoughts). This project involved three scientific studies designed to examine, across these dimensions, how the use of three face creams (named serenity, energy and joy) is associated with internal states of well-being that align with the specific objectives of each cream.

The well-being dimensions were assessed through a multimodal analysis: physiological measures, non-conscious psychological measures and behavioral measures. The approach involved several other innovative aspects, such as the use of a scientific procedure to pre-condition participants into an internal state relevant to the intended effects of the creams.

2. Materials and Methods

2.1. Panel

All the evaluations were conducted following the principles of the Declaration of Helsinki and compliance with local applicable laws, regulatory and ethics requirements. All the subjects provided written consent to allow their participation prior to the study.

Each study is carried out in a specific laboratory (well-controlled environment) with a panel of 45 male and female, a sample size chosen to ensure statistical power. They all purchased

their skincare products through selective channels and looked for a global well-being solution (practicing yoga, meditation, paying attention to a balanced diet, being interested in massages...) and having an expanded vision of beauty (such as being comfortable with their age). They must not have sensory perception problems or factors that have a problematic influence on measures (e.g. cardiac variability) or acute disorders related to the concept of "well-being" (e.g. anxiety, depression, etc).

2.2. Procedure

Measures and assessments were taken at different time points through the first application of a combination of a serum followed by a cream: baseline, activation, during both product application and post-application (figure 1). The entire procedure was repeated after 4 weeks twice daily for the long-term outcomes phase.

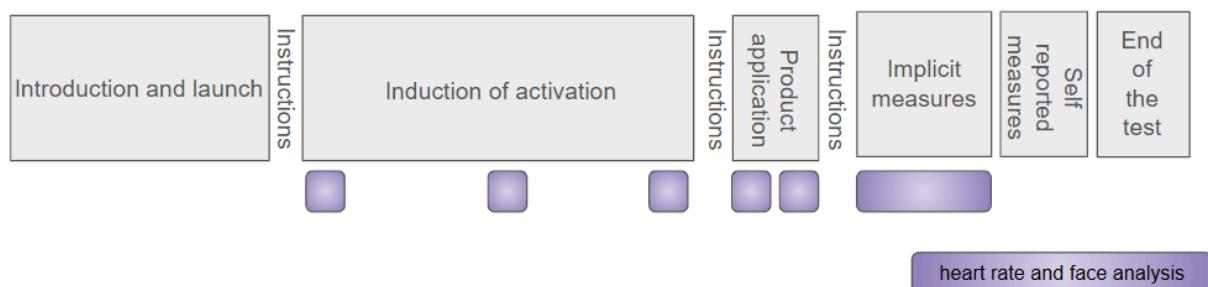


fig. 1: procedure

The methodological procedure comprised a set of specific steps. Apart from the introductory and closing steps, all the steps were managed autonomously by the scientific software and therefore without any interaction with the researcher to avoid certain biases. This software was therefore programmed to expose the participant to the different steps in the defined order, provide the participant with clear instructions at the beginning of each step, during each step, display the stimuli according to the defined parameters (display order, display time, responses and reaction times to be recorded, etc.).

For the induction of the inner state phase, we used a scientifically approved audio sequence to induce a specific emotional state in participants. The type of induction varied depending on the cream being tested:

- For the energy cream: low activation of neutral valence (emotionally "flat" state)
- For the serenity cream: high activation of negative valence (i.e. a state of stress/anxiety)

- For the joy cream: low activation of negative valence (involving emotions such as sadness, melancholy; feeling down).

2.3. Heart rate [1,2,3]

The heart rate is a physiological response of the body through the autonomic nervous system. It is an indicator most often used for that system. It is controlled by sympathetic and parasympathetic activity (increase or decrease in heart rate, respectively) but predominantly by the parasympathetic system (e.g. relaxation leading to a reduction in heart rate). It is thus the indicator of the body's level of activity, particularly useful to quantify and validate the efficacy of an activation induction procedure. We used one of the most pertinent measuring tools, the Polar H10, according to a recent meta-analysis, having conducted rigorous comparative analyses of the current best tools against a broad set of criteria.

2.4. Facial expression analysis

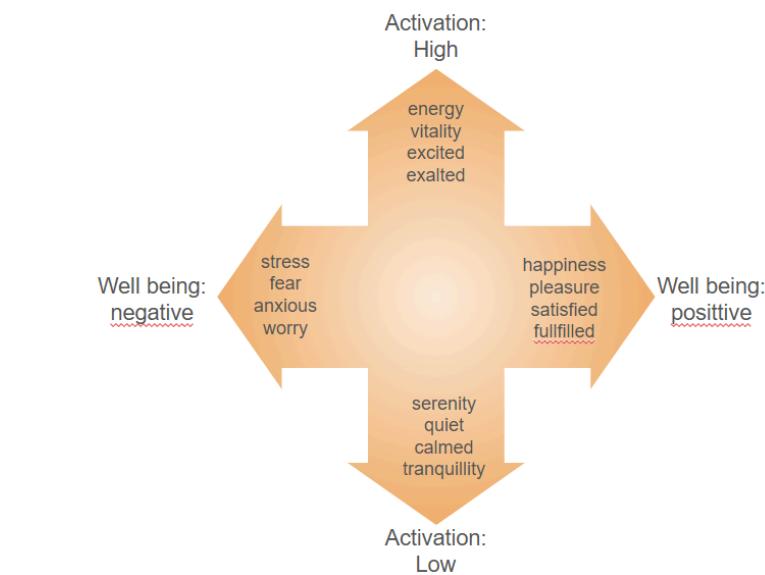
We performed measurement of the emotional responses in the face based on a video of the subject participating in the study. The tool, recognised by the scientific community, made it possible to identify the face, the position of a highly complex network of points precisely and continuously, dynamically on the face [4]. We conduct complex analyses (30 sets of data per second, i.e. more than 93,000 data items per participant within the framework of this study), to achieve scores corresponding to degrees of basic emotions and dimensions of valence and activation.

2.5. Unconscious psychological measures (activation of “Activation” and “Well-being” concepts)

Indirect measures were used to examine the extent to which participants were in specific internal states related to well-being. These measures involved assessing the ease of cognitive processing of various constructs related to well-being (see Figure 2), by precisely examining the response times (in milliseconds) required to categorize these constructs using specific procedures. These constructs were defined based on various criteria (e.g., semantic proximity to the internal states under investigation, affective valence and intensity, lexical structure, and degree of familiarity). The underlying principle of these techniques is that being in a specific internal state (e.g., serenity) facilitates the processing of stimuli related to that state (i.e., shorter response times to identify and categorize these stimuli). These techniques, which require mastery of numerous parameters, have been shown through scientific research to be highly relevant for this type of study. They notably offer the advantage of allowing the examination of individuals' reactions in an “unconscious” manner, without

participants being able to deliberately distort the measures or the resulting conclusions (unlike explicit self-reported measures [5,6].

figure 2:



3. Results

3.1 Heart rate

→ Duo Serenity

The application of the serum induces a peak of the heart rate, followed by its decrease, which is intensified by the application of the serenity cream, translating into a state of relaxation (figure 3).

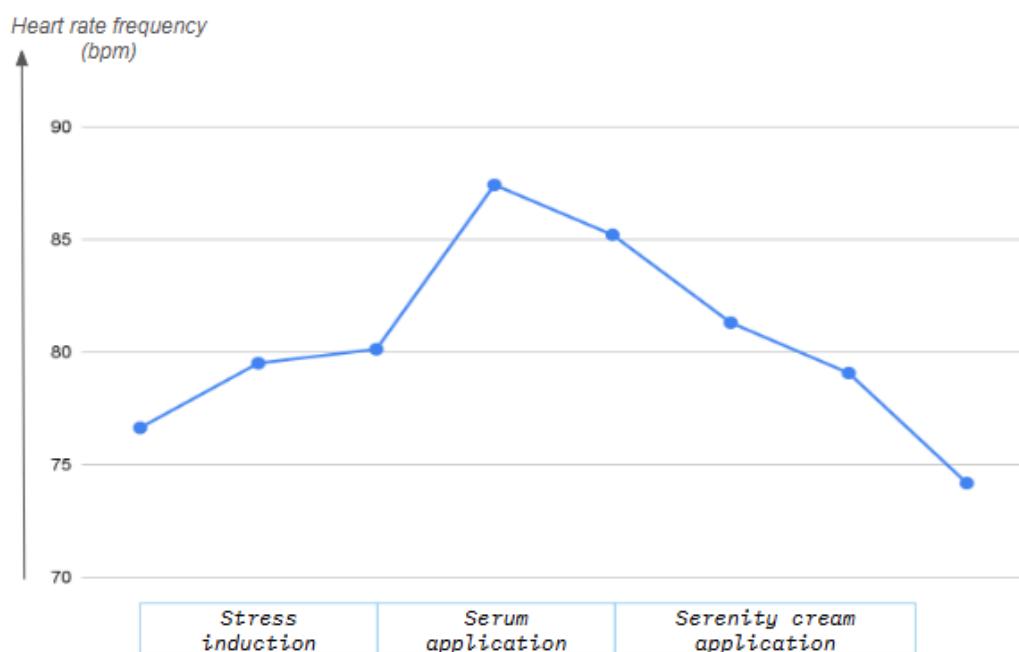


Figure 3: heart rate variation during the application of the serum then the serenity cream.

3.2 Facial expression analysis

→ Duo Energy

The application of the serum induces an increase in emotional intensity, reinforced by the application of the energy cream (figure 4).

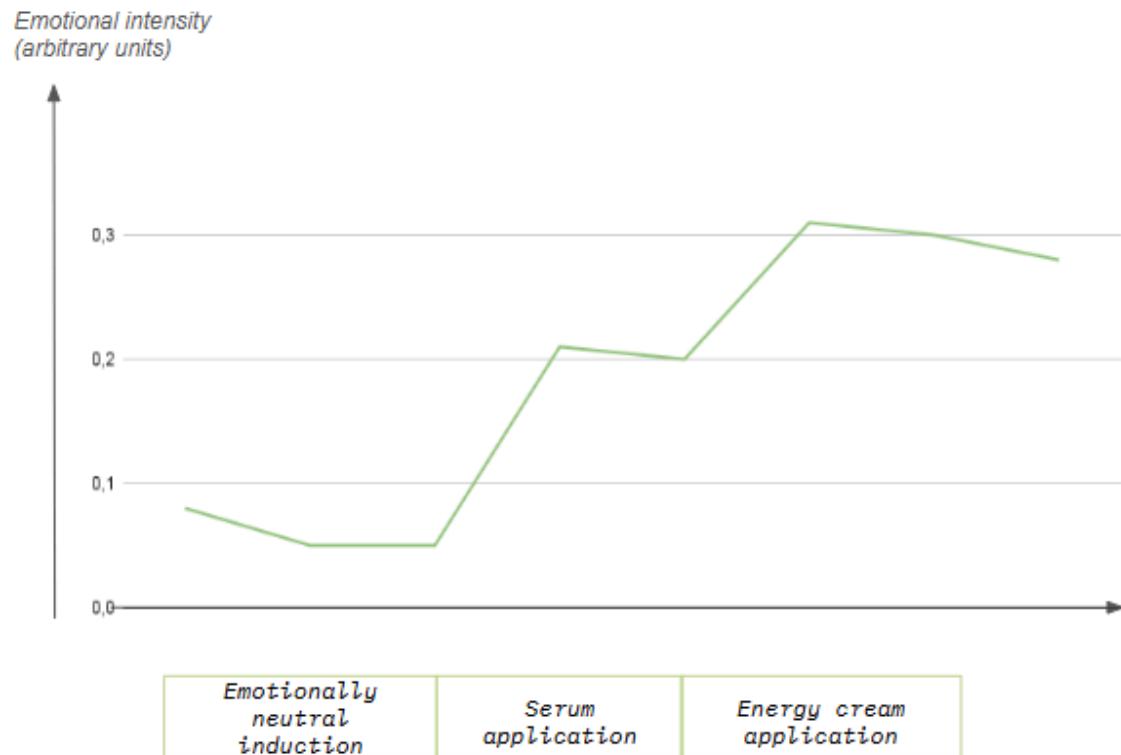


Figure 4: intensity of emotions provided by the application of the serum followed the application of the energy cream

→ Duo Joy

The application of the serum rebalances the emotions after an induction of the sadness (more positive emotions) and the application of the joy cream induces a more intense increase in positive emotions (figure 5).

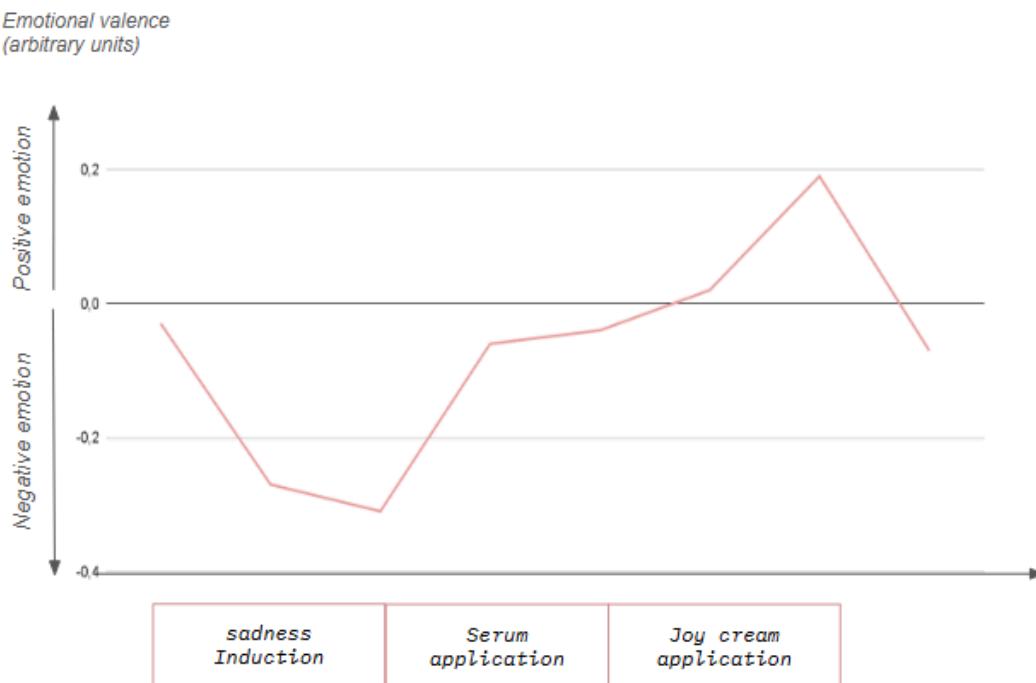


Figure 5: valence of emotions provided by the application of the serum followed the application of the joy cream.

3.3 Unconscious psychological measures

During the test, subjects activated more :

→ Duo Energy

stimuli related to energy, vitality, excitement and exhilaration.

→ Duo Serenity

stimuli related to serenity, quietude, appeasement and tranquility.

→ Duo Joy

stimuli related to well-being: happiness, pleasure, satisfied and fulfilled.

4. Discussion

→ Duo Energy

The application of the serum followed by energy cream induces:

- ★ a reinforced increase in activation, intensity (at physiological, psychological and emotional levels),
- ★ a clearly positive internal state (emotional and well-being).

→ Duo Serenity

The application of the serum followed by serenity cream induces:

- ★ a significant relief (physiological, psychological and emotional),
- ★ a clearly positive internal state (emotional and well-being).

→ Duo Joy

The application of the serum followed by joy cream induces:

- ★ a reinforced increase in activation, intensity (at physiological, psychological and emotional levels),
- ★ a clearly positive internal state (emotional and well-being).

Here is the scheme of the road traveled by the internal state of the subject when using our duos serum and cream (figure 6).

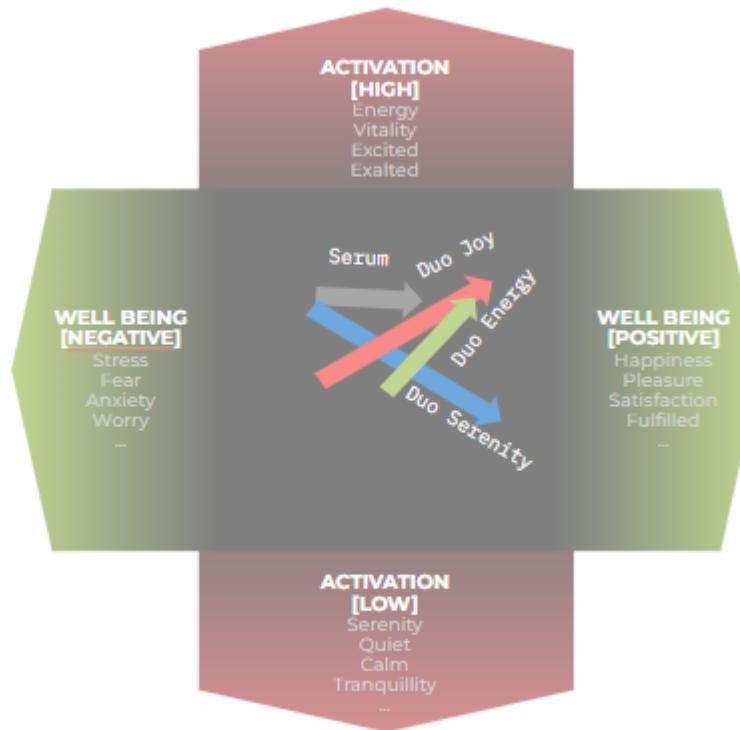


Figure 6: valence and arousal of each cream and of serum through the application.

5. Conclusion

Drawing on state-of-the-art scientific methods and expertise, this project shows that it is possible to objectively and precisely determine the extent to which product use is associated with positive effects on well-being.

The studies aimed to provide a reliable and precise diagnosis of the inner states associated with product use. The induction procedures generally showed proof of efficacy, with heart rate and facial emotion measures reacting as expected to the audio inductions.

The results suggest that the different creams have distinct immediate impacts on well-being indicators. The joy cream appears to increase both emotional activation and positive valence. The serenity cream, following an induction of stress/anxiety, seems to decrease emotional activation and increase positive valence, potentially counteracting the induced negative state. The energy cream, following a 'flat' emotional state induction, shows an increase in psychophysiological activation and a slight increase in positive emotional valence in the long term.

Explanatory factors for these effects are suggested in the reports and include the intrinsic elements (product composition), sensory elements (scents, colors, textures), product packaging, excitement/desire to use the product, and the application protocol. For the 'Sérénité' cream, the involvement of the person in the application video (eyes closed, soothed face) and the longer application time were also noted as potential factors. The application protocol itself, with instructions like "energetically lift skin...", might contribute to activation levels.

The reports emphasize the use of a rigorous and complex approach combining different measures to provide a comprehensive understanding of the inner states associated with product use, overcoming limitations of solely relying on self-reported data.

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