

Press information

How do our brains react to textiles? –The SOFIA study provides answers

Scientists from the Neuromarketing Labs and the Hohenstein Institute are currently working on a pilot study for the perception of textiles worn close to the body. An experimental test records the effect of clothing on the emotions and thinking processes in the human brain.

24-Jul-2013 | 491-EN

BÖNNIGHEIM/ASPACH Scientists from two different fields – textile research and neurosciences – are working together to understand how we perceive, feel or evaluate clothing on our skin. The researchers use special measuring devices in the laboratory to record the friction parameters (tribology) of textiles on human skin. This is followed by measurement series using high resolution EEG examinations on test subjects to provide exciting insights into our brain and the feelings generated during the wearing of textiles.

Prof. Dr. Dirk Höfer, director of the Department of Hygiene, Environment & Medicine at the Hohenstein Institute and Dr. Kai-Markus Müller, managing director of The Neuromarketing Labs, are currently conducting this worldwide unique pilot study for the perception of textiles worn close to the body.

The scientists agree: Previous neurophysiological research on the processing of sensations (perception) was strongly focused on acoustic and visual influences on the human capacity for performance and concentration. But what about the material that touches the largest human organ – the skin – for 24 hours every day without interruption? How does clothing influence our intellectual capacity and what exactly do the wearers feel? Can wellness textiles or business textiles actually trigger relaxation or even actively influence a person's physical regeneration?

These and other questions are now being examined in the framework of the cooperation between The Neuromarketing Labs and the Hohenstein Institute under the aspect of neuroscience for the first time. The research project ZIM-KF First-Layer 2136724CJ2 already combined friction tests (friction measurements of textiles on the skin) with neurophysiological methods to analyse the test subjects' acceptance of the textiles. A 64-channel EEG (electroencephalography) is used as a new method to provide insights into the activity of the human brain and its world of emotions down to a millisecond. Based on decades of basic research, the EEG can measure level of attention as well as positive and negative emotions. Compared to context-related evaluation using questionnaires, the advantage of this method is the direct

Herausgeber:
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Hohenstein Textile Testing Institute
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and therefore instinctive evaluation of arising emotions. Under the scientific direction of Dr. Kai-Markus Müller and Davide Baldo, The Neuromarketing Labs modified the basic scientific analysis methods and approaches to allow economical and practical application.

The tribological systems for testing friction on the skin allow textile manufacturers to characterise important properties such as static or dynamic friction coefficients in comparison to standardised, biometric human skin (HUMskin). This skin model possesses the typical surface structure and elastic properties of human skin (see figure 2).

For the EEG examinations regarding the perception of clothing, the team from the Department of Hygiene, Environment & Medicine of Prof. Dr. Dirk Höfer specifically developed a special textile skin applicator which they christened SOFIA (SOFIA, acronym: Standardised Operating Fabric Applicator, see figure 3). SOFIA is an ideal supplement to the tribological measuring methods and for the first time ever allows textiles to be moved along different parts of the human body with adjustable pressure and adaptable speed, i.e. the parameters crucial to perception. Using SOFIA in combination with the EEG electroencephalography now provides the researchers in the SOFIA study with objective and controlled recordings of how the human brain reacts when the fabric touches different parts of the body.

Dr. Kai-Markus Müller is the managing director and founder of The Neuromarketing Labs. He worked in basic brain research for over 10 years and has had several years of experience in private enterprises, including as a management consultant at Simon-Kucher & Partners. He founded The Neuromarketing Labs in 2011 to provide the industry with state-of-the-art neuroscience findings and research methods. More information can be found at www.neuromarketing-labs.com

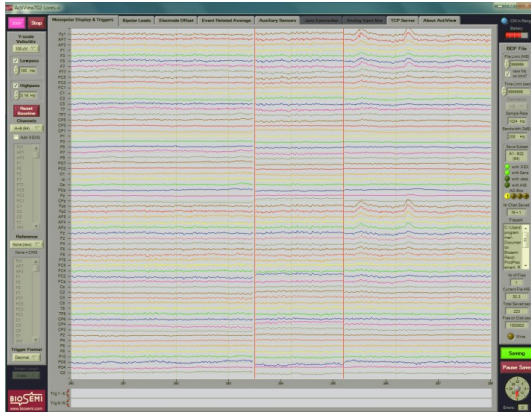
Prof. Dr. Dirk Höfer is director of the Department of Hygiene, Environment & Medicine and deputy institute director of the Hohenstein Institut für Textilinnovation gGmbH (HIT).

His interest is focused on textile-related influences on health. He has developed numerous medical textiles with protective and therapeutic functions and refined methods and models for examining the effect of materials in contact with humans or microorganisms. As a specialist physician for anatomy he is interested in the perception of textiles on human skin from a neurophysiological point of view.

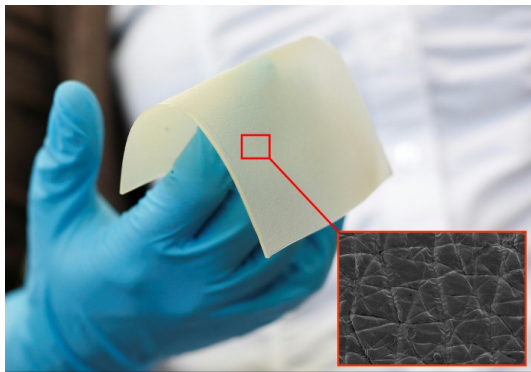
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Part of a 64-channel EEG spectrum for objective and controlled recording of the reaction of the human brain, e.g. to contact with textiles. ©The Neuromarketing Labs



Standardised biometric human skin (HUMskin) from the Department of Hygiene, Environment & Medicine. ©Hohenstein Institute – Department of Hygiene, Environment & Medicine



Neurophysiological test subject study using EEG. The textile applicator SOFIA for the first time ever allows textiles to be moved along different parts of the human body with adjustable pressure and adaptable speed. ©Hohenstein Institute – Department of Hygiene, Environment & Medicine