

Erasmus+ KA2 Strategic Partnerships for Higher Education
Implementation of Consumer Neuroscience and Smart Research Solutions in Aromachology
(NEUROSMARTOLOGY) 2018-1-SK01-KA203-046324

Erasmus+ KA2 Strategic Partnerships for Higher Education

**Implementation of Consumer Neuroscience
and Smart Research Solutions in Aromachology
(NEUROSMARTOLOGY)
2018-1-SK01-KA203-046324**

**Output 2 (O2)
Creating a Reference Database**

The European Commission's support for the production of this publication does not constitute an endorsement of the contents, which reflect the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

Erasmus+ KA2 Strategic Partnerships for Higher Education
Implementation of Consumer Neuroscience and Smart Research Solutions in Aromachology
(NEUROSMARTOLOGY) 2018-1-SK01-KA203-046324

Methodology of O2 research activities within the NEUROSMARTOLOGY project

Key areas of the research:

- **Production/Management**
- **Trade**
- **Services**

The aim is to examine the impact of aromatization and air quality on human emotions in selected areas, and the economic results (number of produced units, accident rate, evaluation of the working environment, sales, sale of specific products, number of scanned goods at the checkout, customer satisfaction, number of sold services, selection of specific service, environmental assessment, etc.).

Intellectual Output O2

Joint research for mutual comparison

Based on the discussions during the training activity C1 on the intellectual output O1 in Poprad in May 2019, it was agreed that the research will take place in each partner country:

1. *At the universities/educational institutions (university snack-bars)*
2. *Small grocery stores (department od sweets)*

Research in each country will consist of several parts:

- A. Association tests.
- B. Monitoring the impact on the selected economic indicator (e.g. number of units sold, environmental assessment) without using aromatization.
- C. Monitoring the impact on the selected economic indicator (e.g. number of units sold, environmental assessment) with using aromatization.
- D. Transfer of the results to a joint database.

A. Association tests

A joint association test/questionnaire survey in English will be developed and translated into the language of each partner institution. Through the specialized platform for data collection samolab.online, an e-mail will be sent to each partner institution with a link to the survey in the relevant language version. The task of each partner organization will be to send the link

Erasmus+ KA2 Strategic Partnerships for Higher Education
Implementation of Consumer Neuroscience and Smart Research Solutions in Aromachology
(NEUROSMARTOLOGY) 2018-1-SK01-KA203-046324

to at least 100 respondents who undergo testing at both conscious and unconscious levels by facial biometrics (respondents must have access to the camera during testing). The platform will inform the respondent of the testing conditions in accordance with GDPR. The aim of the test will be to find out what aroma is most often associated with university snack-bars and departments of sweets. The result will be the selection of aromas for use in real conditions of the university snack-bars and departments of sweets in grocery stores.

Before the launch of testing, it will be necessary to conduct a pilot test in each country on a sample of 5-10 people in order to verify the clarity of the questions/association tasks and remove any mistakes. Subsequently, the link will be distributed to the target segments (university students/customers in 3 age categories).

The project coordinator will ensure, through an external commercial entity, the establishment of association tests after receiving the translations from each country in which the testing will take place as well as the subsequent distribution of links in the relevant language versions to partners.

B. Monitoring the impact on the selected economic indicator – without aromatization

Sales, quantity of selected food sold in the university snack-bars and departments of sweets in stores will be monitored through the specialized platform. The employee of the particular working shift will record the sales into the system, or the number of sold units of the food category and the price for 1 piece, at the end of the opening hours. The platform will also include a space for a “Note” in case of an unforeseen event during opening hours, e.g. early sell-out of the monitored food category, power outage, etc. The system works in such a way that after entering the value it counts down the time during which the data can be changed. After the timeout, the entered values cannot be changed to prevent data manipulation. The software platform (see Figure 1) for collecting this type of data runs on every Windows interface, works offline and will be sent to all partner institutions.

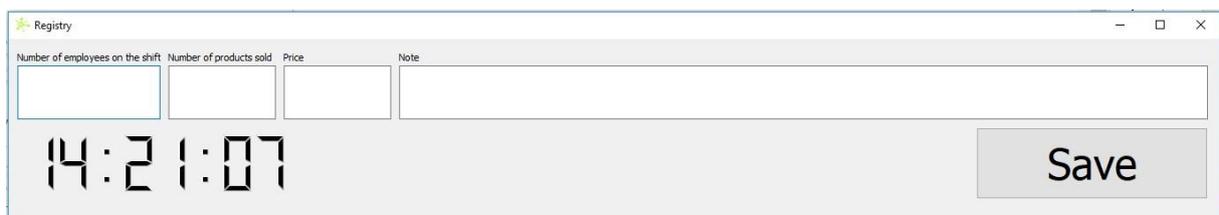


Figure 1 Software for recording sales and the number of sold units of a selected food category

Erasmus+ KA2 Strategic Partnerships for Higher Education
Implementation of Consumer Neuroscience and Smart Research Solutions in Aromachology
(NEUROSMARTOLOGY) 2018-1-SK01-KA203-046324

At the same time, customer satisfaction with the snack-bar/store environment will be monitored through the patented technology for collecting neuromarketing data (a specially designed 22-inch kiosk with the function of collecting unconscious feedback – see Figure 2). The deployed research technologies will be provided through an external company and will be sent to each partner country. The logistics and timetable for deploying the equipment in each country will be sent to the partners after approval of the methodical procedure of data collection in the real conditions.



Figure 2 Graphical scale through which students/customers evaluate the sales environment

Data collection without aromatization will take place at the snack-bar/store for one month. The location of the kiosk (Figure 3) will be consulted with the responsible managers in the snack-bar/store so that it does not affect the operation in any way, but at the same time attract sufficient attention. It is important that also other staff will be informed about the data collection, while the precise details of the main objective of the research will not be published in order to avoid distorted results. The data collection process will be in accordance with GDPR rules and all data will be anonymized. Besides the above data, air quality information (temperature, humidity, CO₂, VOC dust particulates PM₁₀, PM_{2.5}) will be constantly recorded via a data logger (Figure 4), which will also be sent to partners with the kiosk. Through the air bags and electric pump, the collection of air samples will be carried out, which will also be delivered with other equipment. Each institution will then send the filled bag to UCT (Prague, Czech Republic) by the fastest form of transport (ideally within 48 hours), where an in-depth analysis by gas chromatography will be performed. Air sample collection should be carried out at least once at each place in each country (once per period without aromatization).

Erasmus+ KA2 Strategic Partnerships for Higher Education
 Implementation of Consumer Neuroscience and Smart Research Solutions in Aromachology
 (NEUROSMARTOLOGY) 2018-1-SK01-KA203-046324



Figure 3 Panel for collecting conscious and unconscious customer feedback

The project coordinator will ensure, through the external commercial entity, the logistics of the equipment to be used in the 1st phase (without aromatization) and 2nd phase (with aromatization) of testing to the countries where the research will take place.



Figure 4 Data logger for air quality monitoring in the defined environment

C. Monitoring the impact on the selected economic indicator – with aromatization

Data collection with aromatization will take place at the snack-bar/store for one month, after the end of the previous monitoring period without aromatization. An aromatizing unit will be placed on the kiosks that can be turned on by pressing a button. The task of the partner in this case will be to adjust the intensity of the aromatization according to the size of the aromatized area, or according to the location of the equipment in the defined area. It is important that other employees are also informed about the data collection in this case, while the precise details of the main objective of the research will not be published in order to avoid distorted results. The data collection process will be in accordance with GDPR rules and all data will be anonymized. Besides the above data, air quality information (temperature, humidity, CO₂, VOC dust particulates PM10, PM2.5) will also be constantly recorded via a data logger. Through the air bags and electric pump, the collection of air samples will be carried out, which will also be transported to UCT (Prague, Czech Republic) by the fastest form of transport (ideally within 48 hours), where an in-depth analysis by gas chromatography will be performed. Air sample collection should be carried out at least once in each country (once per period with aromatization). Eventually, aroma testing may be extended to the third month (1st month aroma A, 2nd month aroma B), if another aroma will be tested. In this case, the procedure will be the same and the task of the partner will be the simple replacement of the new aroma in the aromatizing unit.

The selection of 1 or 2 specific aromas will be on the basis of association tests that will be conducted in each country, as well as consultations with experts (REIMA, cooperating neurologists, information obtained from the available literature review).

D. Transfer of the results to a joint database

All acquired data will be recorded offline to the memory cards of the devices, which will be distributed to the project coordinator in Slovakia (SUA in Nitra) after the test, where this data will be transformed into the reference database, which will be subsequently shared with each partner. In the case of available Internet connection (only in the case of the kiosk), data can be automatically downloaded to the common storage without the need for additional manual data transmission.

Memory cards can be sent for processing when returning the borrowed technologies back to Slovakia.

Erasmus+ KA2 Strategic Partnerships for Higher Education
Implementation of Consumer Neuroscience and Smart Research Solutions in Aromachology
(NEUROSMARTOLOGY) 2018-1-SK01-KA203-046324

Partial researches by each partner

Besides the joint research, which is essential for the creation of the reference database, each partner can conduct their own research in the field of aromatization and its impact on emotions and economic outcomes, based on options available to them.

Testing process

Before running the test, it will be necessary to conduct training for managers in the snack-bar/store, explaining the data collection process and the way how to familiarize employees with monitoring the sales environment, the quantity of items sold and customer satisfaction. After the initial briefing, there will be training on how to operate and correctly use the data collection technologies (mainly the records of the number of employees, sold units of selected food and prices) as well as the explanation of the time schedule. At the same time, a contact person will be assigned whom the responsible persons will be able to contact in the event of a failure of the feedback collection.

Organizational and technical support of the research

At the university snack-bar/store, it will be necessary to place:

- 1 notebook with a specialized software platform, or the software platform to be installed on an existing PC with Windows for recording the number of workers, selected food items sold and price,
- the kiosk for collecting conscious and unconscious feedback of the customer's assessment of the sales environment,
- a data logger with sensors to monitor air quality factors.

All the above-mentioned technologies will be placed in the agreed locations, which will be connected to 220 V (via an extension cable) depending on the available options.

The exact schedule of association tests and tests in snack-bars/stores will be developed after the approval of the methodical procedure by all parties.

Planned results for intellectual outputs O1 and O2

Outputs and materials within O1 and O2 will be published and available to the general and scientific public through the following outputs:

Erasmus+ KA2 Strategic Partnerships for Higher Education
Implementation of Consumer Neuroscience and Smart Research Solutions in Aromachology
(NEUROSMARTOLOGY) 2018-1-SK01-KA203-046324

1. **Monograph:** The output O4 will be divided into chapters according to particular key areas for which the teams are responsible (4 groups divided above) and will contain the knowledge gained within O1 and O2.
2. **Special Issues (International journals):** Publication of acquired knowledge within O1 and O2 in selected domestic and foreign journals (Web of Science, SCOPUS, Current Contents).
3. **Three review articles:** Publication of acquired knowledge in O1 and O2 in peer-reviewed journals.

Within O2, we have created an implicit test that will be conducted online in 5 countries using a special samolab online platform. It is an advanced form of questioning (questionnaire survey) through which, in addition to traditional feedback, also facial biometry and responders' reaction time is recorded. The platform allows for a full range of specialized questions (e.g. association tests, A/B testing). It is adapted to several forms of use (in a laboratory and via remote mailing to respondents) and available in several languages. Respondents can do such testing through home computers, tablets or even mobile devices.

Link: <https://samolab.online//exam/link/896/0/1469aec520e4abab698dbe643b6848ab>

In addition to the association test, pilot studies of the effect of selected aromas on the emotional response is carried out in laboratory conditions. The aim is to obtain a database on conscious and unconscious preferences of respondents, which will be taken into account when creating the software of the smart aromatizing unit within O3. This knowledge will also help in the selection and deployment of aromas within O2 testing, on the basis of which a universal reference database on the influence of aromas on the preferences and emotions of people in partner countries will be created.

Erasmus+ KA2 Strategic Partnerships for Higher Education
Implementation of Consumer Neuroscience and Smart Research Solutions in Aromachology
(NEUROSMARTOLOGY) 2018-1-SK01-KA203-046324



Figure 5 Testing in laboratory conditions using electroencephalography (EEG)