DEAKIN UNIVERSITY

CASS CENTRE FOR ADVANCED SENSORY SCIENCE

NEWSLETTER

Centre for Advanced Sensory Science (CASS) Newsletter #3 December 2017

Latest news

The Centre for Advanced Sensory Science (CASS) wishes all our friends and colleagues a Merry Christmas and all the best for a prosperous 2018. We are looking forward to 2018, and increasing our food industry interaction. Specifically we are offering a certificate 2.5 day short course Introduction for Sensory and Consumer Science in June 2018 (see page 11 for details). If you are interested in up-skilling yourself, or some of your staff in the sensory and consumer science field, then contact CASS at cass@deakin.edu.au for more details.

In This Issue

Centre for Advanced Sensory Science Team 2017

An appropriate quote for the holiday season

"The only way to get rid of a temptation is to yield to it"

— Oscar Wilde (1854-1900)

CASS IN THE MEDIA

A major success in 2017 for CASS was the publication on the seventh “taste”.. carbohydrates!

There's a new taste sensation

LUCIE VAN DEN BERG
MEDICAL REPORTER

ADDICTED to bread, pasta and potatoes? Turns out your tastebuds could be to blame.

Food scientists from Deakin University in Victoria have uncovered evidence for a seventh taste: carbohydrate.

Not only do people who are more sensitive to it appear to consume more starch, they also have wider waistlines.

Understanding what drives people to eat too much is vital to address the obesity epidemic where two in three Australian adults are now overweight or obese.

The human tongue can detect a small number of tastes: salty, sweet, sour, bitter and umami, but scientists suspect they can also register a starchy taste from carbohydrates.

Professor Russell Keast head of Deakin's Centre for Advanced Sensory Science said his team showed the mouth could sense two common carbohydrates found in bread, pasta and rice.

His study of 34 adults, published today in the *Journal of Nutrition*, showed that those who are more sensitive to carbohydrates consume more starchy food and also have a larger waist circumferences.

CARB HIT: Deakin University researcher Dr Julia Low at the sensory labs. Picture: DAVID CAIRD

Source: Herald Sun, Melbourne, 26th October 2017.

Crunching the numbers: Media breakdown

- The coverage surrounding the publication release reached an audience of 4,857,098 people.
- The research gained significant coverage in the print media with an advertising space rate of AUD500,000.
- 5 forms of media platforms presented the findings (TV, AM radio, FM radio, newspaper and online news).
- 71 total news items were produced on the research.

Carbohydrate may be our seventh “taste”!

In 2015 CASS researchers named fat as the 6th taste. The naming of fat as a taste was the culmination of 8 years of research on the topic. There is still a distance to go before there is enough evidence to name carbohydrate as the 7th taste, but the research we have produced is a good start. As part of her PhD studies, Dr Julia Low completed a comprehensive taste study looking a how we respond to carbohydrates, a 2nd study looking at how our individual sensitivity to carbohydrate associates with diet and also weight circumference. A 3rd study looking at satiety will be published in the coming months.

SCIENTISTS FIND EVIDENCE OF ‘STARCH’ TASTE

No wonder carbs taste so good

LUCIE VAN DEN BERG

ADDICTED to bread, pasta and potatoes? Your tastebuds could be to blame.

Deakin University food scientists have found evidence of a new taste: carbohydrate.

Those more sensitive to it appear not only to consume more starchy food, like rice and potatoes, but appear also to have wider waistlines.

Understanding what drives people to eat too much is vital to addressing epidemic obesity: two in three Australian adults are now overweight or obese, increasing their risk of disease.

The tongue can detect a small number of tastes — salty, sweet, sour, bitter and umami — but scientists suspect it can also detect a starchy taste.

It had been assumed the craving for carbohydrates was for the sugar they contained, and that all else was tasteless.

Professor Russell Keast head of Deakin’s Centre for Advanced Sensory Science, said his interest was piqued by a study of athletes using an oral carbohydrate drink rinse.

“They wouldn’t swallow it, but the solution increased their performance,” he said.

“This indicates that there must be some form of receptor mechanism in the mouth that signals to the brain that there were carbohydrates present.”

In a study of 34 adults, published today in the *Journal of Nutrition*, his team showed the mouth could sense two common carbohydrates found in bread, pasta and rice.

They also looked at how sensitive people were to that taste, their carbohydrate intake, their energy intake overall, and waist measurements.

“We found people who are more sensitive to carbohydrates, which means they can taste it at lower concentrations, consume more starchy food as a percentage of energy, and they also have larger waist circumferences,” Prof Keast said.

Two years ago, his team named fat as a taste. But those more sensitive to that taste consumed fewer fatty foods.

Prof Keast said that if compounds in carbohydrates to which people were particularly sensitive could be identified, food could be tailored to help people consume fewer carbs.

Recent overseas studies support the case for carbohydrate being classed as a taste, but to meet the strict criteria the taste receptor in the mouth must still be identified.

Andrew Costanzo, 28, was happy to join the study, drinking cups of water with a bread-like taste.

“I don’t know how else to describe it, but they tasted ‘carbohydratey’,” he said.

He said he was more drawn to savoury than sweet flavours.

“I’ve got an Italian background so I eat a lot of pasta, bread and potatoes,” he said.

He is of a healthy weight, and said the study findings wouldn’t change his diet.

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Source: Herald Sun, Melbourne, 26th October 2017.

Mystery of carbs revealed

LUCIE VAN DEN BERG

ADDICTED to bread, pasta and potatoes? Turns out your tastebuds could be to blame.

Food scientists from Deakin University have uncovered evidence for a seventh taste: carbohydrate.

Not only do people who are more sensitive to it appear to consume more starchy tastes, like rice and potatoes, they also have wider waistlines.

Understanding what drives people to eat too much food is vital to addressing the obesity epidemic where two in three Australian adults are now overweight or obese, increasing their risk of disease.

The human tongue can detect a small number of tastes: salty, sweet, sour, bitter and umami, but scientists suspect they can also register a starchy taste from carbohydrates.

It has been assumed that we only craved sugars in carbohydrates and everything else was invisible to taste.

Deakin’s Professor Russell Keast said his interest was piqued after reading about athletes using an oral carbohydrate drink rinse.

“They wouldn’t swallow it, but what the exercise scientists found was that the solution increased their performance.

“This indicates that there must be some form of receptor mechanisms in the mouth that signals to the brain that there were carbohydrates present.”

In a *Journal of Nutrition* study published today his team showed the mouth could sense two common carbohydrates found in bread, pasta and rice.

They also looked at how sensitive people were to that taste, how many carbohydrates they ate, their energy intake overall and measured their waists.

Source: Hobart Mercury, Hobart, 26th October 2017.

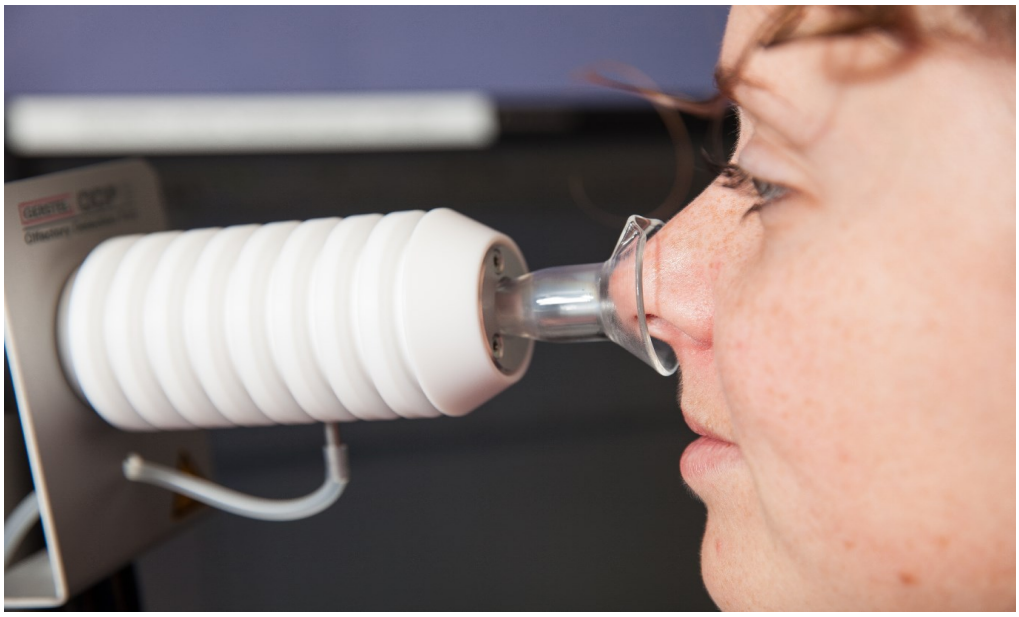
CASS RESEARCH

Various research projects were undertaken at CASS in 2017 and will continue into 2018. These are a few of our highlights...

Aroma analysis

As shelf life increases, many food and beverage products suffer in terms of the formation of off flavours and aromas, which decrease consumer liking. However, it can be difficult to pinpoint the causes of these off flavours without the use of advanced technology. Aroma analysis by Gas Chromatography-Olfactometry (GC-O) is important in helping to determine these off-flavours and aromas. GC-O can be used at multiple time points along the shelf life (and beyond) of a food or beverage, in order to identify those aroma compounds which may be linked to, or even responsible for, changes in consumer liking and purchase intent. Using multiple assessors, an extract of the aroma can be 'sniffed', and using ratings of intensity and description, aroma compounds can be identified and compared against other time points, or competitor products. When coupled with sensory evaluation, GC-O may also provide information on the chemical reasoning behind certain descriptors and liking ratings.

For more information contact cass@deakin.edu.au



GCO in Action. Please contact cass@deakin.edu.au if you are interested in flavour analysis

Sustainability of our food system

The sustainability of our food system is a complex and important challenge, and it is necessary to understand drivers and barriers to greater consumer demand for healthy and sustainable products. A new focus for CASS in 2018 is on understanding decisions in relation to selecting healthy and sustainable foods. We will investigate how consumers trade-off health and sustainability attributes against others like taste and price when choosing various food products, and how these differ for different types of consumers according to their psychosocial characteristics such as their personal values and knowledge, and socio-demographic characteristics.

For more information contact: georgie.russell@deakin.edu.au

CASS RESEARCH Continued

Designing sustainable and healthy food structures

Legumes are a highly nutritious plant food that contains good quality protein, fibre, minerals and a range of phytochemicals. Reported studies show the potential of using legumes in designing healthy food structures.

Legumes such as chickpea and yellow peas have been used in extruded and baked snack products to support the need for healthy snacks that contain low fat, high protein and high dietary fibre levels. Further, recent consumer research identified flexitarian as one of the top ten food trends. Plant based meat substitutes (imitation meat) will be in a great demand in future years. Legumes in combination with vegetable gums can play a role in creating meat-like structures with similar texture and mouth-feel. Research will be continuing in designing heathy foods using underutilised cereals and legumes which will include the physical and chemical mapping of the newly designed products as well as assessing consumer perception and acceptance.

For more information: shirani.gamlath@deakin.edu.au

A biopsychosocial approach to understanding food choices

Developing strategies to assist consumers in selecting and consuming healthy foods is a complex challenge that can only be met with a thorough understanding of the different reasons underlying repeated food choices, for different consumers. In 2018 CASS is in an unique position to be able to examine the combined and interacting effects of selected biological (e.g., taste sensitivity, metabolic response), psychological (e.g. satiety responsiveness, emotional eating) and social (e.g. sociodemographic, peers) factors known to affect repeated food choices. This biopsychosocial approach to understanding food choices will ultimately yield greater insights than examining any of the factors in isolation.

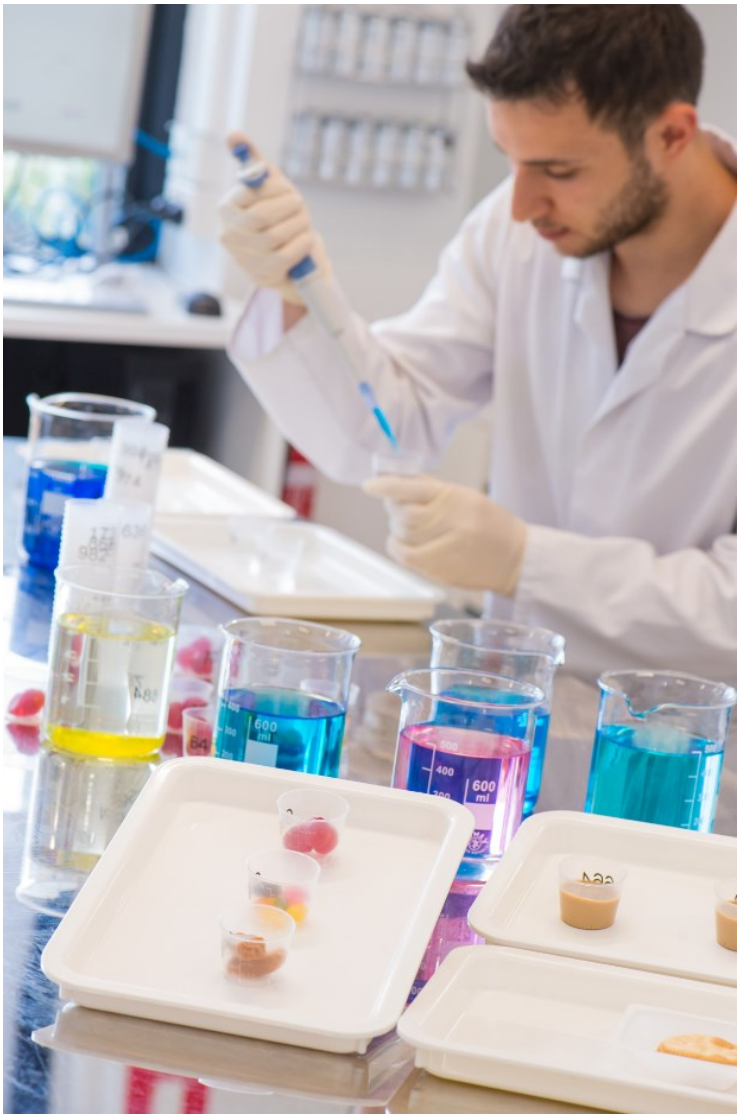
For more information contact: georgie.russell@deakin.edu.au

CASS RESEARCH Continued

Effects of front of pack attributes on food choices

Food packaging is undoubtedly an important factor influencing on food choices. Food packets carry a wide range of front-of-pack attributes and information, developed to persuade the consumer about the particular attributes of the product. Each of these attributes may have an influence on consumers. But how does a consumer make sense of all of the front-of-pack attributes and make a decision? Our research has focused on understanding the relative impact of these attributes on the food choices on parents when they were asked to select a novel breakfast cereal for their child. Results of the choice experiment showed that nutrition information is important (e.g., the Health Star Rating system), but that visual elements (especially those depicting the product inside the packet) can influence consumers more. Interestingly, though, the front-of-pack attributes that consumers tend to use when making decisions depended upon the characteristics of the child for which they were choosing the product. Parents with fussy children, for instance, were less likely to rely on the nutrition information available on the front of the breakfast cereal packets than parents of less fussy children.

For more information contact: georgie.russell@deakin.edu.au

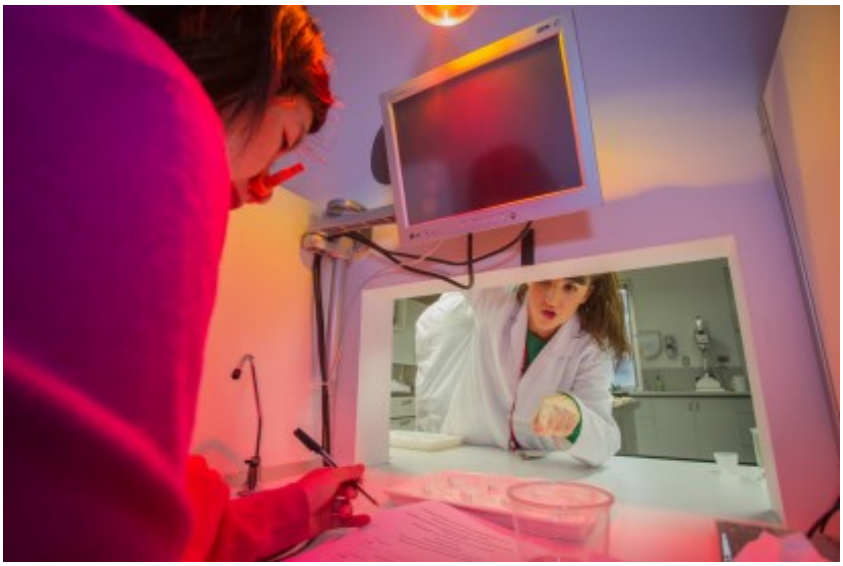


CASS RESEARCH Continued

Novel packaging attributes can influence consumers

CASS recently investigated if a new form of packaging labelling, which playfully informs consumers of how much calories something contains, can influence the consumption and liking of high calorie snack food. The new label represents a pictogram of a person walking with above it the amount of minutes an average person needs to walk in order to burn a serving of a given food. It has been suggested that such logos result in a lower food intake, but it remains to be investigated if such logos would influence consumers' liking and consumption of high calorie containing foods such as chips and savoury biscuits. Preliminary data from two CASS studies suggest that the logo does influence snack food consumption and to some extent liking, but it might only be effective in those consumers who are already reasonably health conscious. Future studies will focus on changing the logo as such that it will also influence those who are less health focussed. Sensory marketing is an ongoing research area for CASS. Two honour students finished their first studies, and one PhD student and one honours student will start next year to continue work in the area of sensory marketing.

For more information contact gie.liem@deakin.edu.au



The Centre for Advanced Sensory Science laboratory in action.

Want to join our CASS consumer database?

Our consumer panellists are a unique group who get paid to assist with various studies and industry related consumer snack food taste testing.

For more information, visit: http://www.deakin.edu.au/exercise-nutrition-sciences/research/centre-for-advanced-sensory-science-cass/join-us

CASS RESEARCH Continued

What's new in sensory marketing?

With the festive season nearing, calorie overload is just a stone's throw away. Sure, it is only Christmas and New Years' Eve once a year, but let's not forget all the other opportunities to overeat like Eastern, Australia Day, Cup day, birthdays, Christmas in July, holidays, Fridays- to celebrate the start of the weekend, Saturdays to celebrate the weekend, and of course Monday- so we can forget that the weekend has passed. With more than 6 in 10 Australians being too heavy and with so many tasty calorie-dense food options around us, it is time to look into sensory solutions. Although we don't want to limit consumer choice, we do want them to think about the things they, often unknowingly, eat. It is good to know that most food enjoyment happens at the start of the meal and usually decreases once we eat more of a particular food. So why overeat? Maybe this happens because we do not really pay attention to the amount we eat or we think "the more the better". Maybe the consumers need a little reminder or a nudge into the healthy direction, without strongly saying "Do not eat this food, it is dangerous", or strongly limit consumer choice.

By applying sensory marketing CASS is currently investigating how these little nudges can be provided to consumers. Sensory marketing aims to use and influence our sensory perception of food in such way that it changes our food choices, buying and consumption behaviour. CASS and other labs in the world have repeatedly shown that consumers' liking and choice of food products can be influenced by on-pack messages, design and logos.

For example, CASS research showed that consumers tend to think that a soup labelled with "low salt" tastes less salty, even if the actual soup they are tasting has no salt reduction. This is important information for food producers who want to lower the sodium content of their foods. The effect of sensory marketing is also culture dependent. For example the positive halo around fresh Australian milk causes some Chinese consumers to favour the taste of UHT milk with a fresh label compared to the same milk without a fresh label, no such was found for Australian consumers.

For more information contact gie.liem@deakin.edu.au

Descriptive Analysis Techniques: Traditional and Rapid techniques

Are you interested in having objective measures of perceived flavour of your products?

CASS runs Descriptive Analysis and also a variety of rapid methods.

In product research and development within the food industry, it is important to understand the sensory characteristics of products that are contributing to the acceptance or rejection within the market. Traditionally, descriptive methodology using a highly trained panel is employed to objectively describe the product of interest. Quantitative Descriptive Analysis uses a highly trained panel to objectively describe and quantify sensory attributes repeatedly and consistently. Those selected for the panel should be highly discriminating and readily able to articulate product characteristics. Given the demanding nature of this procedure, its implementation can be costly and time consuming. For this reason, more rapid and cost effective methods have been recently developed that use the consumer as a replacement for a trained panel.

Recent research has explored the possibility of using untrained consumers in product research and development to provide the descriptive profile of products. These methods are gaining popularity, with untrained consumers more commonly used in the application of rapid methods. Napping, a specialized form of projective mapping, is one such method. This methodology requires assessors to produce individual perceptual maps illustrating product differences and similarities on a two-dimensional space. This allows products to be assessed simultaneously rather than by the monadic approach of conventional profiling. Assessors are not trained in the use of a common descriptive language, rather they devise their own criteria for evaluating and separating products. The importance individual assessors place on particular attributes is therefore taken into account through this methodology.

Previous research has demonstrated that the perceptual maps generated via partial Napping with a trained panel, as well as global Napping, have similar discriminating power to those produced through descriptive analysis.

Ultra-Flash Profiling can be incorporated with Napping to gain additional information regarding the specific sensory attributes of a range of products. This was developed as a flexible method to rapidly provide a descriptive profile of a products' key sensory characteristics. Although not shown to produce the same level of precise detail as conventional profiling methods, the incorporation of Ultra-Flash Profiling with Napping provides similar information to that obtained through traditional descriptive analysis.

Please contact CASS (cass@deakin.edu.au) if you think you may want to see our Descriptive Panel, or a rapid method such as Napping to understand the flavour of your products.

This year marks the second year of the CASS-Academy 12 week program, a training hub run by CASS for talented students who show an interest in sensory and consumer science.

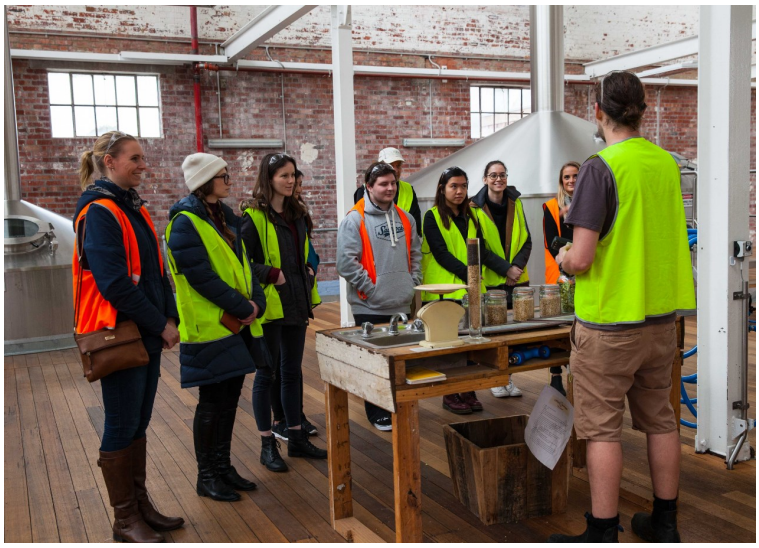
Four selected students were placed on 3 x 4 week rotations, providing them with the opportunity to gain valuable hands-on experience and insights in the field of food science. The 3 rotations were focused in the areas of Data Analysis, Consumer Science and Flavour Analysis. Each rotation involved assisting academic experts on projects within their area of expertise. The CASS Academy program concluded with an overnight visit to Cereal Partners Worldwide in Rutherglen where students participated in an immersion program with the Research and Development team. A visit to the Uncle Toby's factory was included where the students were able to experience first-hand what is involved in the food manufacturing process.

The CASS Academy program allows for students to gain additional skills and experience alongside their university studies. Furthermore, it provides a helpful insight into the prospects of completing Honours.

To all our graduating CASS Academy students, congratulations and good luck with your future endeavours.

For more information on CASS Academy visit out website:

http://www.deakin.edu.au/exercise-nutrition-sciences/research/centre-for-advanced-sensory-science-cass/join-us



CASS Academy excursion

"A year at CASS Academy has helped me gain self confidence, overcome challenges and invaluable personal development. The program gave me insight into the different areas of sensory science and first hand experiences with leaders in the field!."

- 2017 CASS Academy student

CASS SENSORY SCIENCE SHORT COURSE

2018

Do you want to increase your experience in the field of sensory science? CASS is excited to announce the development of its new sensory science short course, set to begin June 2018.

CASS acknowledges the need for an increase in training and exposure for aspiring food scientists. Targeted at recent graduates employed in the food industry who may need some basic up-skilling in sensory and consumer science, this 2.5 day short course aims to broaden individual knowledge and practical application of sensory science solutions to real world sensory scenarios.

You will learn from experts in the field and get to solve real problems using sensory methodology.

For more information, please contact the team at CASS: cass@deakin.edu.au

Date: 19-21 June 2018

Duration: 2.5 days

Location: City centre and the CASS sensory labs at Deakin Burwood, Melbourne

Price: $4,000 per participant

Latest publications and presentations

- Bolhuis D, Costanzo A, Keast R. (2017) Preference and perception of fat in salty and sweet foods. Food Quality and Preference (in press).

- Costanzo A, Orellana L, Nowson C, Duesing K, Keast R. (2017) Fat taste sensitivity is assocaited with short-term and habitual fat intake. Nutrients 9(7).

- Gawel R, Cicerale S, Keast R. (2017) The mouthfeel of white wine. Critical Reviews in Food Science and Nutrition doi: 10.1080/10408398.2017.1346584.

- Goh, J. R., Russell, C. G., & Liem, D. G. (2017). An Investigation of Sensory Specific Satiety and Food Size When Children Consume a Whole or Diced Vegetable. *Foods, 6*(7). doi:10.3390/foods6070055.

- Han P, Keast R, Roura E. (2017) Salivary leptin and TAS1R2/TAS1R3 polymorphisms are related to sweet taste sensitivity and carbohydrate intake in a buffet meal. British Journal of Nutrition (in press).

- Heinze JM, Costanzo A, Baselier I, Fritsche A, Lidolt M, Hinrichs J, Frank-Podlech S, Keast R. (2017) Oil perception detection thresholds for varying fatty stimuli and inter-individual differences. Chemical Senses 42(7) p585-592.

- Keast R., Liem G, Thornton M, Cicerale S. (2017). Is Carbohydrate a taste? *Food Australia* 69(5) p32-33.

- Keast R., Liem G, Thornton M, Cicerale S. (2017). If you don't like hurting animals, why do you eat them? Food Australia 69(1) p32-33.

- Keast R, Liem G, Thornton M, Cicerale S. (2017). The good, the bad and the toxic. *Food Australia 69*(2) p40-41.

- Keast R, Liem G, Thornton M, Cicerale S. (2017). What's the real reason we don't like airline food? *Food Australia 69*(3) p38-39.

- Keast R, Liem G, Thornton M, Cicerale S. (2017). Why you should let your kids play with their food. *Food Australia 69*(4) p32-33.

- Laws, R. A., Denney-Wilson, E., Taki, S., Russell, C. G., Zheng, M., Litterbach, E. K., Ong, KL., Lymer, J. S., Elliott, R., Campbell, K. J. (in press). Obesity prevention in infants using mHealth: key lessons and impact of the Growing healthy program on milk feeding, timing of introduction of solids and infant growth. *in press*.

Contact Us

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Twitter: @DeakinCASS

Blog: Deakin-CASS.wordpress.com

Photos: JadietPhotography/ Deakin University

Latest publications and presentations cont.

- Liem DG. (2017). Infants' and children's salt taste perception and liking, a review. *Nutrients*, 9, 1011:doi10.3390/nu909101
- Litterbach, E. K., Russell, C. G., Taki, S., E, D.-W., Campbell, K. J., & Laws, R. (in press). Qualitative evaluation of the Growing healthy Program: Factors influencing engagement and behavioral determinants of infant feeding in an mhealth program. *Journal of Medical Internet Research mHealth and uHealth, in press*.
- Low J, Lacy K, McBride R, Keast R. (2017). Carbohydrate taste sensitivity is associated with starch intake and waist circumference in adults. *The Journal of Nutrition*, 147(12), p.2235-2242.
- Low J, Lacy K, McBride R, Keast R. (2017) Psychophysical evaluation of sweetness function across multiple sweeteners. *Chemical Senses* 42 p111-120.
- Mennella, JA, Bobowski NK, Liem DG. (2017) Taste and Smell. In Swaiman's pediatric neurology, 6th edition. Eds Swaiman et al. Elsevier, ISBN: 9780323371018
- Russell, C. G., Burke, P. F., Waller, D. S., & Wei, E. (2017). The impact of front-of-pack marketing attributes versus nutrition and health information on parents' food choices. *Appetite, 116*: 323-338. doi:10.1016/j.appet.2017.05.001
- Russell, C. G., Haszard, J. J., Taylor, R. W., Heath, A. L., Taylor, B. J., & Campbell, K. J. (in press). Parental feeding practices associated with children's eating and weight: what are parents of toddlers and preschool children doing? *Appetite, in press*.
- Taki, S., Lymer, S., Russell, C. G., Campbell, K., Laws, R., Ong, K. L., Elliott, R., Denney-Wilson, E. (2017). Assessing User Engagement of an mHealth Intervention: Development and Implementation of the Growing Healthy App Engagement Index. *JMIR Mhealth Uhealth, 5*(6), e89. doi:10.2196/mhealth.7236

Please contact us if you would like copies of any of our publications.

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