



# coffee&health

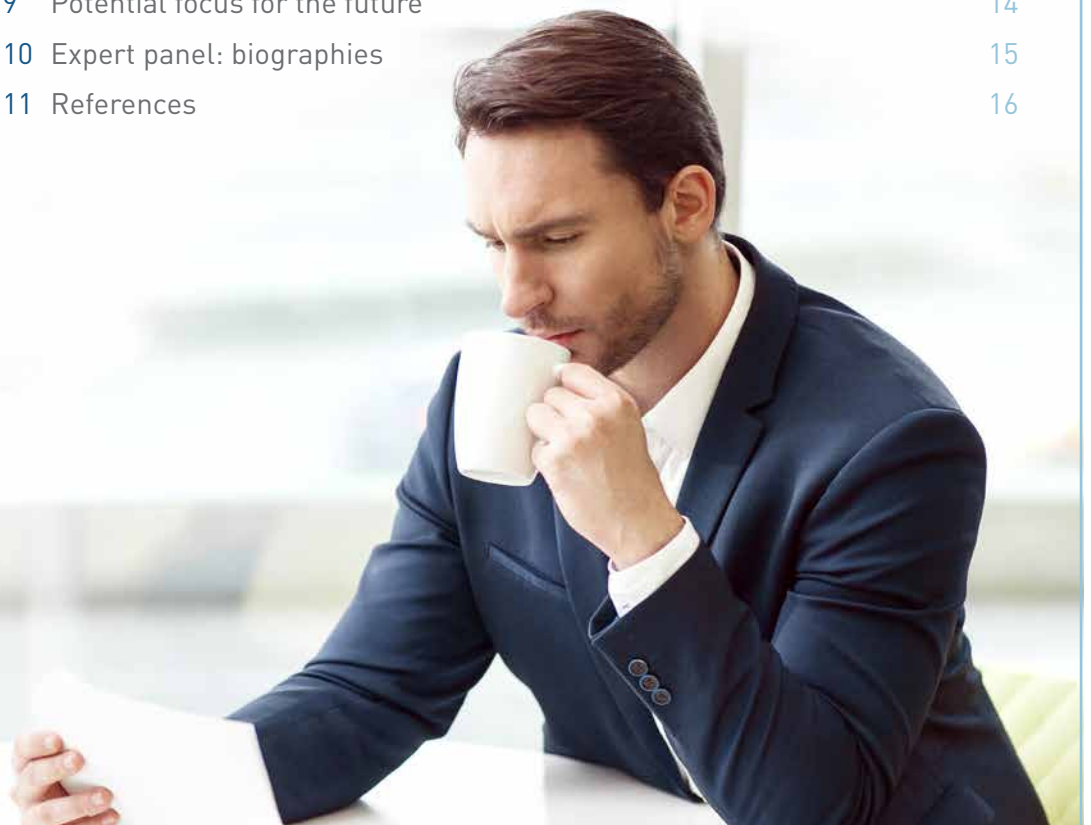
from the institute for scientific information on coffee

## EXPERT REPORT

The good things in life:  
coffee in the workplace

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## Overview

Extensive research has shown that caffeine consumption is associated with an increase in alertness, concentration and performance<sup>1-12</sup>. Many people will have seen first-hand the widespread custom of coffee in the workplace, whether in an office setting, or in scenarios such as shift work in factories or hospitals. Coffee breaks are an ingrained part of work culture, and the phrase 'taking a coffee break' can be synonymous with taking a short period of time away from work to chat with colleagues, clear one's head or simply have some downtime<sup>13,14</sup>.

Caffeine has also been shown to aid alertness and concentration in specific situations, such as working night shifts or when driving long distances<sup>2,15-24</sup>. Caffeine consumption may also help with sleep inertia — helping people feel more awake after they have woken up abruptly<sup>17</sup>.

It's not surprising, therefore, that the sight of a commuter with a cup of coffee is a familiar one, as is the coffee machine in the workplace. The association between coffee's taste and the physiological effects of caffeine may be why so many people opt for coffee as their caffeinated beverage of choice.

However, it can be hard to understand the motivations behind people's workplace coffee consumption habits, and whether coffee consumption has an effect on productivity.

With these questions in mind, ISIC commissioned a large survey of workers across six European countries, conducted by market research organisation YouGov. The survey was designed to explore when workers drank coffee during the working day, why they drank coffee, whether it was linked to short breaks, and how they felt coffee affected their productivity. These survey results not only help shed light on the role of coffee in the workplace, but also suggest some ways in which workers' wellbeing could be improved.

ISIC invited eminent experts to a roundtable to discuss the results of the YouGov survey within the context of the latest scientific research on coffee, caffeine and alertness. A representative from The Work Foundation, a leading provider of workplace analysis, evaluation and policy advice, also joined the roundtable, reflecting on the social and economic shifts that will impact future workforces. We need to be aware of the dietary and lifestyle factors that will help maintain the health and wellbeing of an ageing workforce, and the research on lifelong coffee intake in helping certain degenerative conditions is interesting to note in this context<sup>1,2,25-29</sup>.

Although we would benefit from more research on the optimal frequency and length of breaks in the workplace, based on ISIC's survey results, it appears that taking a coffee break occasionally during the working day is viewed as beneficial by many employees.



“These survey results not only help shed light on the role of coffee in the workplace, but also suggest some ways in which workers' wellbeing could be improved.”



# Expert panel on caffeine in the workplace



**Professor Peter Rogers**

*Professor of Biological Psychology, University of Bristol, UK*



**Professor Keith Wesnes**

*Professor of Cognitive Neuroscience, University of Exeter, UK*

*With guest commentary by Dr James Chandler, Policy Analyst, The Work Foundation*

## ISIC survey parameters

The total sample size was 8,239 adults, across six European markets: Finland, Germany, Italy, the Netherlands, Spain, and the UK.

48% of respondents said they were office-based. Only 7% of respondents said that they worked at night, while 25% said that they worked in shifts.

The figures have been weighted and are representative of all of each country's adults (aged 18+).

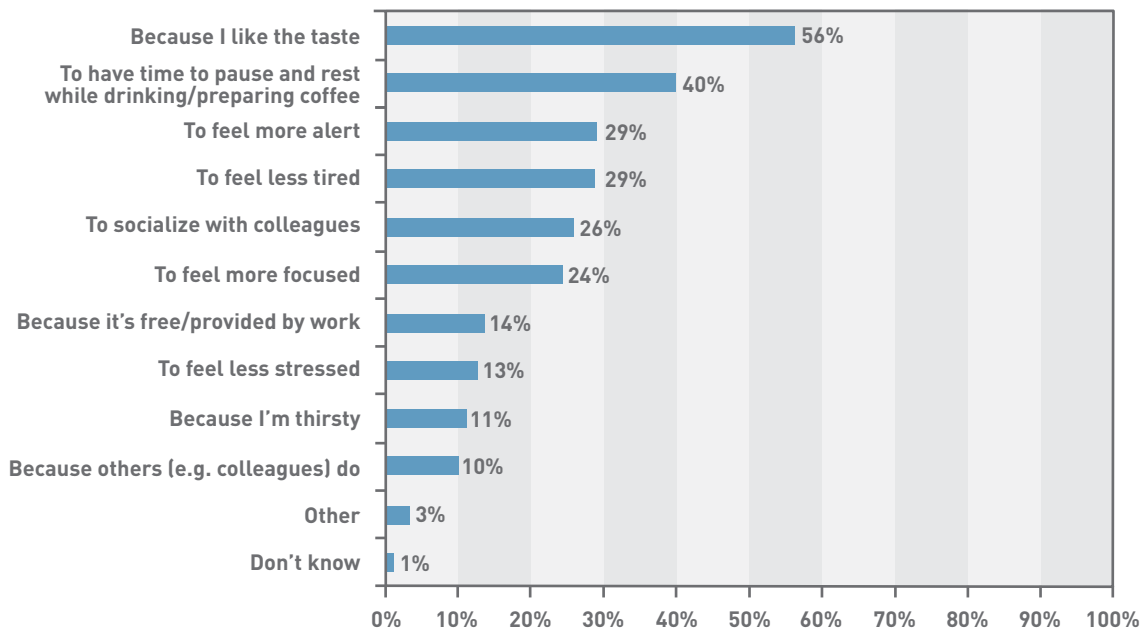




## Why do people drink coffee at work?

Overall, a majority (67%) of ISIC’s survey respondents said they always or often drink coffee during a typical working day.

**You said you drink coffee during work...Which, if any, of the following are your reasons for this? (Please select all that apply)**



Base: all country workers who drink coffee during work (3493)

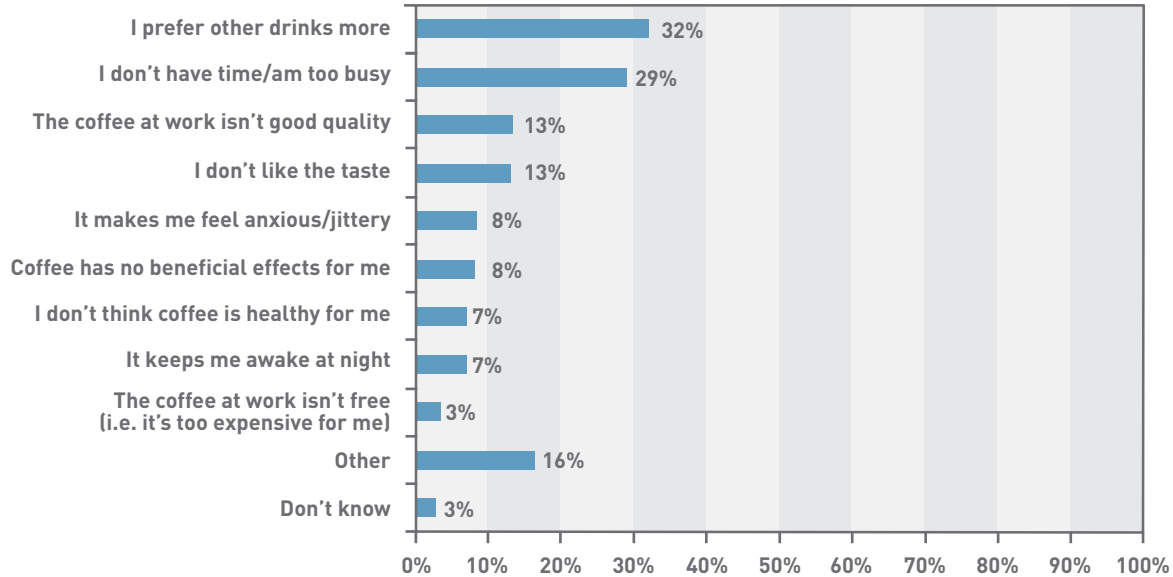
In the survey, the top reasons given for drinking coffee **at work** were: liking the taste (56%); to have time to pause and rest while drinking or preparing coffee (40%); and to feel more alert (29%). Given that over a quarter of respondents said coffee made them feel more alert, this suggests that people are choosing coffee for a boost at work.

In addition, when asked why they drank coffee **before work**, respondents’ main reason was not for the taste, as above, but instead 56% said that they bought or made coffee to drink on the commute into work because it helped them “wake up”.

It is interesting to note that respondents who said they did not drink coffee during work gave reasons relating primarily to personal tastes (such as preferring other drinks more — 32%), or because they didn’t have time (29%). Only 7% thought that coffee wasn’t healthy for them.



**You said you don't drink coffee during work...Which, if any, of the following are your reasons for this? (Please select all that apply)**



Base: All country workers who don't drink coffee during work (478)

During the roundtable, Professor Rogers referenced his own research, with results suggesting that taste preferences influence coffee consumption more than health concerns.

## Attitudes towards coffee

(% of respondents selecting each response)

Statement	% response in relation to coffee drinks
I've never really tried it	7.7
At least one of: I don't like the taste I prefer other drinks	65
It's not good for my health	42
It interferes with my sleep	29
It makes me jittery/shaky	14.5

Source: Rogers P.J. Unpublished data from Dietary Caffeine and Health Study. University of Bristol, UK.





## Coffee consumption habits and mental performance

In light of the fact that many survey respondents said that they drank coffee to either feel more alert, or to wake up in the morning, the roundtable panel discussed the relationship between the caffeine in coffee, and impact on mental performance.

Professor Wesnes described how habitual coffee drinkers exhibit an increase in alertness when consuming a caffeine-containing beverage, when compared with a non-caffeinated beverage<sup>30</sup>. Furthermore, research comparing habitual caffeine consumers with those who do not consume caffeine suggests there is no difference between performance in the withdrawn state, such as after an overnight sleep<sup>30</sup>.

However, other research has suggested that regular caffeine consumers may exhibit mild effects of caffeine withdrawal after an overnight sleep, when compared to those who do not habitually consume caffeine. In such cases, caffeine consumption may restore levels of alertness in habitual coffee drinkers to levels similar to those seen in non-habitual drinkers, rather than increasing alertness above this baseline<sup>31</sup>.

Regular coffee consumers may also become more tolerant to caffeine's effect on wakefulness, compared to infrequent coffee drinkers, who may find coffee drinking has a negative effect on sleep patterns<sup>31</sup>. Research has shown that individuals do respond differently to a caffeine-containing beverage, with some experiencing sleep disturbance if consumed near bedtime, for instance. The differences are partly explained by factors such as an individual's age and body mass, but genetic variations also explain some of the differences observed<sup>32</sup>. Several genes have been identified that affect an individual's sensitivity to caffeine (the ADORA2A and ADA genes as well as the DARPP-32 and PRIMA1 genes, for example)<sup>33,34</sup>. The same amount of caffeine ingested in a beverage can therefore affect two otherwise similar individuals very differently, based on their genetic make-up.

In addition to caffeine's effects on alertness, Professor Rogers also highlighted the fact that caffeine may also help to improve motor and physical performance<sup>35</sup>. Research undertaken by Professor Rogers has suggested that caffeine improves motor performance, helping increase the speed of physical movement. Whilst performance effects are more commonly discussed in relation to athletes, they may also benefit those who undertake manual or physical tasks during their daily work. With frequent consumption, tolerance develops the effects of caffeine, but the degree of tolerance varies, with near complete tolerance to caffeine's alerting effect and little or no tolerance to its effect on physical performance<sup>31</sup>.



“Research comparing habitual caffeine consumers with those who do not consume caffeine suggests there is no difference between performance in the withdrawn state, such as after an overnight sleep.<sup>30</sup>”

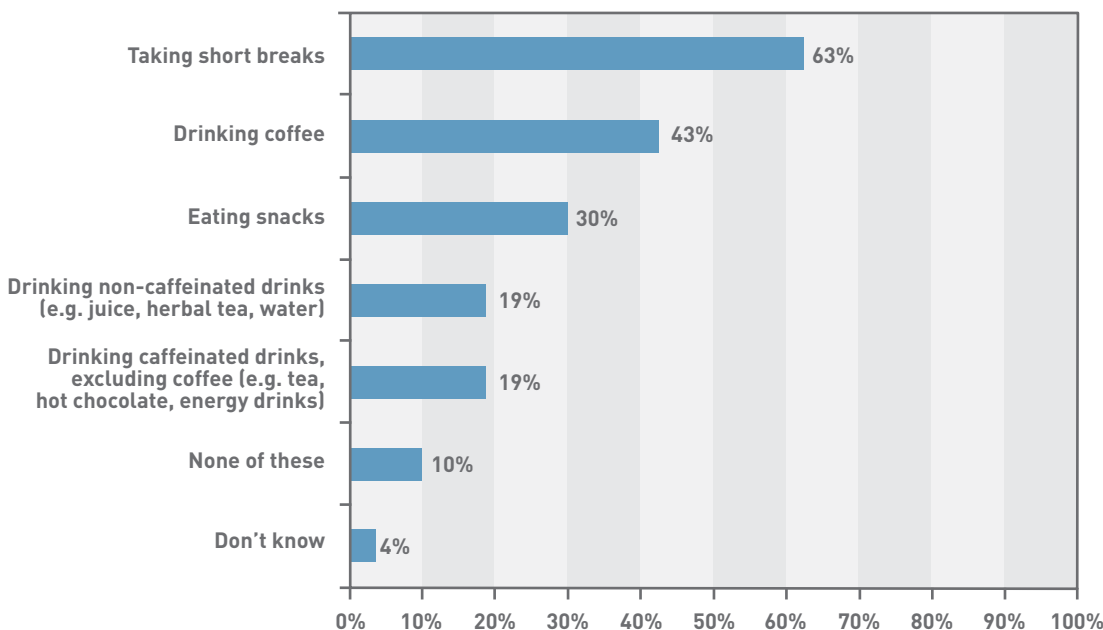


# Short breaks, coffee, and productivity in the workplace

Respondents in every country were most likely to say that taking short breaks improved their productivity. Almost every country said that drinking coffee was the second most likely way of improving their productivity.

Across every country, on average, coffee was the drink most closely associated with productivity, with 43% choosing it over other caffeinated and non-caffeinated options. Professor Peters noted this in the roundtable discussion, suggesting that having work breaks with a reward (i.e. coffee) may improve wellbeing and productivity.

### Which, if any of the following do you think improve your productivity at work? (Please select all that apply)



Base: All country workers (4535)

Italians were most likely to say that coffee made them more productive at work (56%). Overall, respondents selected short breaks as being most likely to improve their productivity (63%). Finns were the biggest proponents of short breaks (75%), compared to just 53% of Dutch respondents.

Short breaks are likely to be combined with a drink or snack. Overall, 56% said they take 1–2 short breaks per day to have something to eat or drink; while almost a quarter (23%) said they take 3–4 short snack breaks. Respondents in Spain were the most likely to take a few short snack breaks, with 72% saying that they took 1–2 breaks a day, compared to just 44% of Dutch respondents. Just over a third (36%) of Finns said they took 3–4 short breaks to eat or drink — the highest across all countries surveyed by ISIC.



However, around one in ten respondents (11%) said they never took a short break at work to eat or drink something during the working day, and a significant minority of respondents — over a quarter (29%) — said they didn't have time or were too busy to drink coffee at work. In addition, 32% said that they didn't have time to make or buy a coffee on their commute to work.

Given that over half of all respondents said that short breaks improved their productivity, these statistics suggest that some workers are struggling to manage their time – and may be becoming less productive in the process. Dr Chandler from the Work Foundation referenced these results during the roundtable, questioning whether these statistics are indicative of a wider workplace problem: workers' autonomy levels and whether they are being given the ability to self-regulate their workload by taking breaks as they see fit.

A question raised during the roundtable discussion was whether any productivity or wellbeing benefits of taking a coffee break are associated with simply taking a break from work, with consuming a cup of coffee, or the two combined? The panel was in agreement that occasional short breaks during the working day are beneficial, encouraging productivity as well as social interactions. They suggested that coffee breaks with co-workers may be a way to facilitate debate and discussion about key topics associated with work, as well as supporting a health and wellness agenda<sup>13,14</sup>.







## Coffee, the workplace and good work

*Dr James Chandler, the Work Foundation*

The findings from the recent ISIC survey, *Coffee in the Workplace*, make for very interesting reading. Perhaps the most significant finding — from our perspective at the Work Foundation — is that as many as 29% of respondents said they ‘didn’t have time’ or were ‘too busy’ to drink coffee at work. Now we have to be cautious because this could be at least partly due to the type of work they do — although almost half of those surveyed worked in an office (with the remainder working in sectors including manual labour, retail, factories, and logistics) — but this suggests that nearly a third of European workers responding to this survey, who cannot find time for a short coffee break, could be facing excessive demands at work with little job control. This has important implications for their health and wellbeing. Since the publication of Karasek’s 1979<sup>1</sup> ‘job demands-control model’, many studies<sup>2</sup> have shown that excessive demands combined with little control over work leads to ‘job strain’ — causing stress — and, in turn, puts workers at risk of several negative physical and mental health outcomes, e.g. heart disease<sup>3</sup> and depression<sup>4</sup>. This contributes to absenteeism and presenteeism (i.e. working at reduced capacity), which comes at a substantial cost to economies across Europe in the form of lost productivity<sup>5</sup>.

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Another component of Karasek’s model comprises social support: workers with a lack of support in the workplace, either from their superiors or their peers and colleagues, are also at risk of deleterious health effects<sup>6</sup>. Support from colleagues in particular improves work environments by relieving stress, which can enhance employee job satisfaction, performance and, in turn, reduce the risk of absenteeism and presenteeism. A small-scale study of Danish public sector workers suggests that shared coffee breaks are an effective means of accessing this social support, by, for example, providing an outlet for work-related frustrations<sup>7</sup>. As suggested by the ISIC survey, potentially a third of workers across Europe may be deprived of this means of support.



The negative effects of excessive demands, and insufficient control and support — i.e. a lack of good work — has an impact on employees' wellbeing and may, in turn, reduce their productivity. Although still the subject of debate, the 'happy-productive worker' hypothesis suggests workers with good health and wellbeing can be more productive: showing higher levels of motivation and engagement in their roles and responsibilities<sup>9</sup>. It is also clear that a worker in poor health will be less productive at work, either by being unable to show up or working at reduced capacity (presenteeism).

Furthermore, for the respondents who were unable to take a break, this may — in itself — adversely affect their productivity. Limited results from a study of 3,000 North American banking staff suggest that, just as shared coffee breaks can enhance social support, they can improve productivity too<sup>7</sup>. This is reflected in the ISIC survey findings: the majority of respondents claimed short breaks and drinking coffee improved their productivity at work. Indeed, the survey offers some — albeit limited — evidence for this: relative to Finns, UK respondents work longer and are more likely to claim they are too busy to take a break, yet the former outrank them in productivity (i.e. GDP per hour worked)<sup>10</sup>. While we shouldn't overstate the significance of this correlation, it is worth noting that the UK economy in particular suffers from low productivity. How caffeine consumption — through drinking coffee — affects workers' productivity should, therefore, be explored in greater detail.

Finally, although inconclusive, there is some evidence to suggest that consumption of caffeine — e.g. through drinking coffee — may play at least some part in preventing age-related cognitive decline<sup>11,12</sup>. Although more research is required to investigate this relationship, the implications of these findings are significant and wide-ranging. From a workplace perspective, they are potentially very important. Across Europe, health problems within the working population are a growing problem, due, in part, to an ageing demographic: the proportion of people aged 65+ will increase from 18.4% to 28.4% by 2080<sup>13</sup>. Yet, increasingly, people are expected to work into their old age: by 2050, the retirement age in several European countries will exceed 70 years<sup>14</sup>. This presents a significant problem. There is, therefore, an imperative to find ways of keeping people in work, healthy, for longer. As such, the relationship between caffeine consumption and cognitive decline warrants further investigation.

“There is some evidence to suggest that consumption of caffeine may play at least some part in preventing age-related cognitive decline<sup>11,12</sup>.”



### About the Work Foundation

Through its rigorous research programmes targeting organisations, cities, regions and economies, now and for future trends, the Work Foundation is a leading provider of analysis, evaluation and policy advice in the UK and beyond.



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## Coffee, alertness and performance

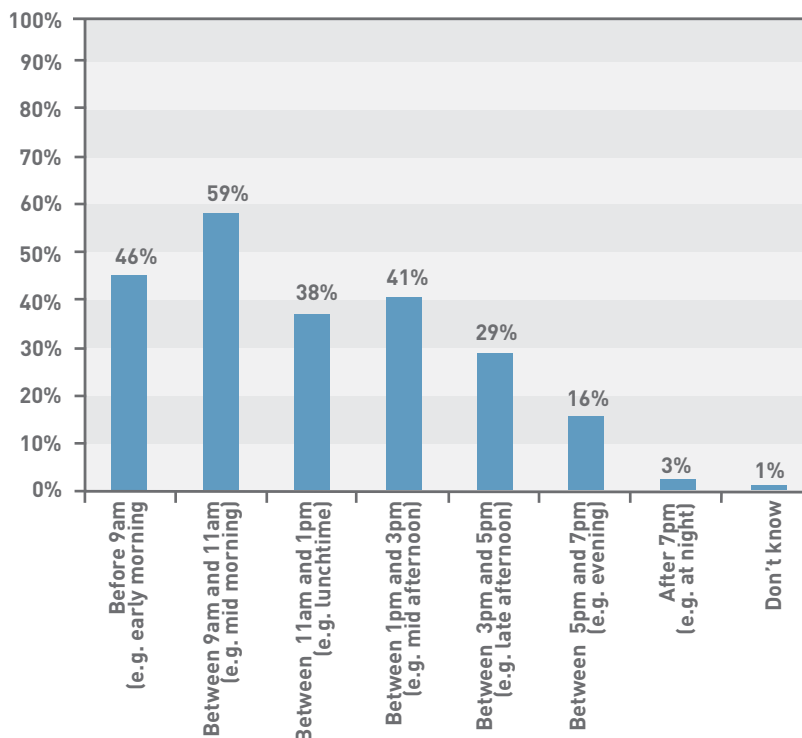
Many survey respondents chose coffee as their preferred beverage in the morning. Over half (57%) of those surveyed drank one to two cups of coffee before work, and similarly, over half (56%) of commuters said they drank coffee on the way to work to help them to wake up.

The association between caffeine and alertness is linked to the adenosine receptors found in the brain. Adenosine, a compound in the body, binds to adenosine receptors in the brain, leading to a chain of events that reduce stimulatory neurotransmitters such as dopamine, in turn producing the sensation of 'being tired'. Caffeine is similar in structure to adenosine and is able to bind to receptors in place of adenosine, increasing feelings of alertness<sup>33,34</sup>.

During the roundtable, Professor Rogers suggested that coffee's popularity as a morning drink could be linked to caffeine's known effects on alertness and wakefulness, which are especially prominent after overnight abstinence from caffeine.

59% of ISIC's survey respondents stated that their main coffee consumption period was between 9.00 and 11.00am, compared to just 29% who chose coffee as a drink in the late afternoon (between 3.00 and 5.00pm). The results show a clear pattern of consumption that peaks in the mid-morning, then reduces in the late afternoon.

### You said you drink coffee during work... During which, if any, of the following times do you typically drink coffee while working? (Please select all that apply)



Base: All country workers drink coffee during work (3493)



Professor Rogers noted during the roundtable that caffeine is a relatively fast-acting compound, with the effects measurable from around 10 minutes after consumption, and up to 2 to 4 hours afterwards, depending on the amount consumed. A typical cup of coffee contains around 75–100mg of caffeine, and is an amount acknowledged to have a benefit on attention<sup>35</sup>. The workplace survey shows a spike in coffee intake first thing in the morning soon after waking, and another slightly smaller spike after lunch, suggesting that coffee is often chosen to wake up in the morning or reduce post-lunch dip in energy and concentration. Later in the day, caffeine consumption reduces, potentially suggesting that people avoid coffee if they feel consuming it in the afternoon interfered with their sleep in the evening<sup>36</sup>.

## Caffeine and cognitive function

Professor Wesnes highlighted research suggesting that coffee consumption may help to improve cognitive function<sup>1,2,15,16</sup>. He suggested that in a workplace situation, this could help employees perform better. However, he also noted that coffee has a complex range of effects that improve some, but not all, aspects of cognitive function. For example, research shows that caffeine appears to improve working memory performance, but not long-term memory<sup>2</sup>.

Professor Rogers addressed the question of whether caffeine intake leads to feelings of jitteriness or feeling 'on edge'. He noted that caffeine's effects are complex and depend on consumption habits: in habitual consumers of caffeine, drinking coffee may bring them back up to their 'normal' level of mental alertness, and is unlikely to make them feel jittery or anxious. Conversely, in people who never or infrequently drink caffeine, coffee consumption may make them feel anxious, tense, or nervous<sup>31</sup>.

## Coffee, healthy ageing, and the European workforce

The experts discussed the increasing body of research suggesting that coffee is associated with a reduced risk of certain degenerative diseases, including type 2 diabetes, cardiovascular disease, and cognitive decline<sup>1,2,25-29</sup>.

Professor Wesnes highlighted a study which suggests that higher caffeine intakes are associated with an improved mental performance in older adults, suggesting a potential cumulative effect of lifelong caffeine consumption, particularly in relation to vascular diseases<sup>37</sup>. A great deal of research has followed since this initial study was published, which largely concurs with these early conclusions<sup>38,39</sup>. Whilst caffeine is considered to be a key compound associated with these effects, other compounds found in coffee, particularly chlorogenic acid, may also be significant<sup>40</sup>. Professor Rogers also noted that



mental performance improvements seem to be associated with older people who are long-term coffee consumers, suggesting a cumulative effect over time rather than short-term gains related to effects on alertness<sup>41-43</sup>.

## Potential focus for the future

The roundtable panel suggested that further research into coffee consumption and healthy ageing would be interesting in certain contexts: for example, whether coffee could help promote wellbeing among Europe's ageing workforce. The panel also suggested that research into the benefits of a short break at work, compared to the benefits of a coffee at work, would help identify whether productivity is enhanced by one more than the other. In addition, identifying the optimal number of breaks needed to increase productivity could be something of interest to employers, even self-employed people who typically have more autonomy over their break times. Future research could help answer these questions, and more.

## About ISIC

The Institute for Scientific Information on Coffee (ISIC) is a not-for-profit organization, established in 1990 and devoted to the study and disclosure of science related to "coffee and health." Since 2003 ISIC has also supported a pan-European education programme, working in partnership with national coffee associations in nine countries to convey current scientific knowledge on "coffee and health" to health care professionals.

ISIC respects scientific research ethics in all its activities. ISIC's communications are based on sound science and rely on research and scientific studies derived from peer-reviewed scientific journals and other publications.

ISIC members are six of the major European coffee companies: illycaffè, Jacobs Douwe Egberts, Lavazza, Nestlé, Paulig, and Tchibo.

[www.coffeeandhealth.org](http://www.coffeeandhealth.org)

Figures, where stated, are from YouGov Plc. Total sample size was 8,239 adults, of whom 4,534 were workers. Fieldwork was undertaken between 15–22 May 2017. The survey was carried out online. The figures have been weighted and are representative of all each country's adults (aged 18+).



## Expert panel: biographies



### **Professor Peter Rogers, Professor of Biological Psychology, University of Bristol, UK**

Professor Rogers studies the area of nutrition and behaviour, particularly how physiological, learned and cognitive controls on appetite are integrated. The results are relevant to identifying the causes of obesity and disordered eating, and to understanding food choice, food craving and food 'addiction.'

Other areas of work focus on associations between diet, mood and cognition, including research on food consumption, alertness and attention, and studies of longer-term influences of diet on psychological health. He studies the psychopharmacology of caffeine, including how preferences for caffeine-containing drinks develop, and the psychostimulant, anxiogenic and motor effects of caffeine.



### **Professor Keith Wesnes, Professor of Cognitive Neuroscience, University of Exeter, UK**

Professor Wesnes specialises in measuring human cognitive function in clinical trials. His PhD into the cholinergic bases of human attention led him to computerize tests of major aspects of cognition, and in the early 1980s to develop the CDR System, an integrated set of computerised tests to assess change in cognitive function in clinical trials. Since 1986 the System has been used in over 1,400 worldwide clinical trials.

He holds Visiting Professorships at the Psychology Department, Northumbria University, Newcastle upon Tyne (since 1997), the Centre for Human Psychopharmacology, Swinburne University, Melbourne, Australia (since 2007), and the Medicinal Plant Research Group, Newcastle University (since 2014). He has over 300 peer-reviewed publications and 9 students have received PhDs under his supervision.

### **Dr James Chandler, Policy Analyst, the Work Foundation**

Dr Chandler is a researcher with experience using both qualitative and quantitative research methods and an understanding of the social determinants of health, particularly the role of work and how the psychosocial work environment impacts on employees' mental and physical health and wellbeing. In his role at the Work Foundation he is primarily focused on developing evidence-based policy recommendations relating to the health and wellbeing at work agenda.

The Work Foundation is dedicated to promoting 'good work' — a complex and evolving concept encompassing the importance of productivity and skills needs, the consequences of technological innovation, and good working practices. The impact of local economic development, wider-economic governmental and societal pressures, and the business needs of different types of organisations all influence our understanding of what makes work 'good'. Central to this concept is how these — and other — factors combine to influence the health and wellbeing of the workforce and individuals seeking to enter it.



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