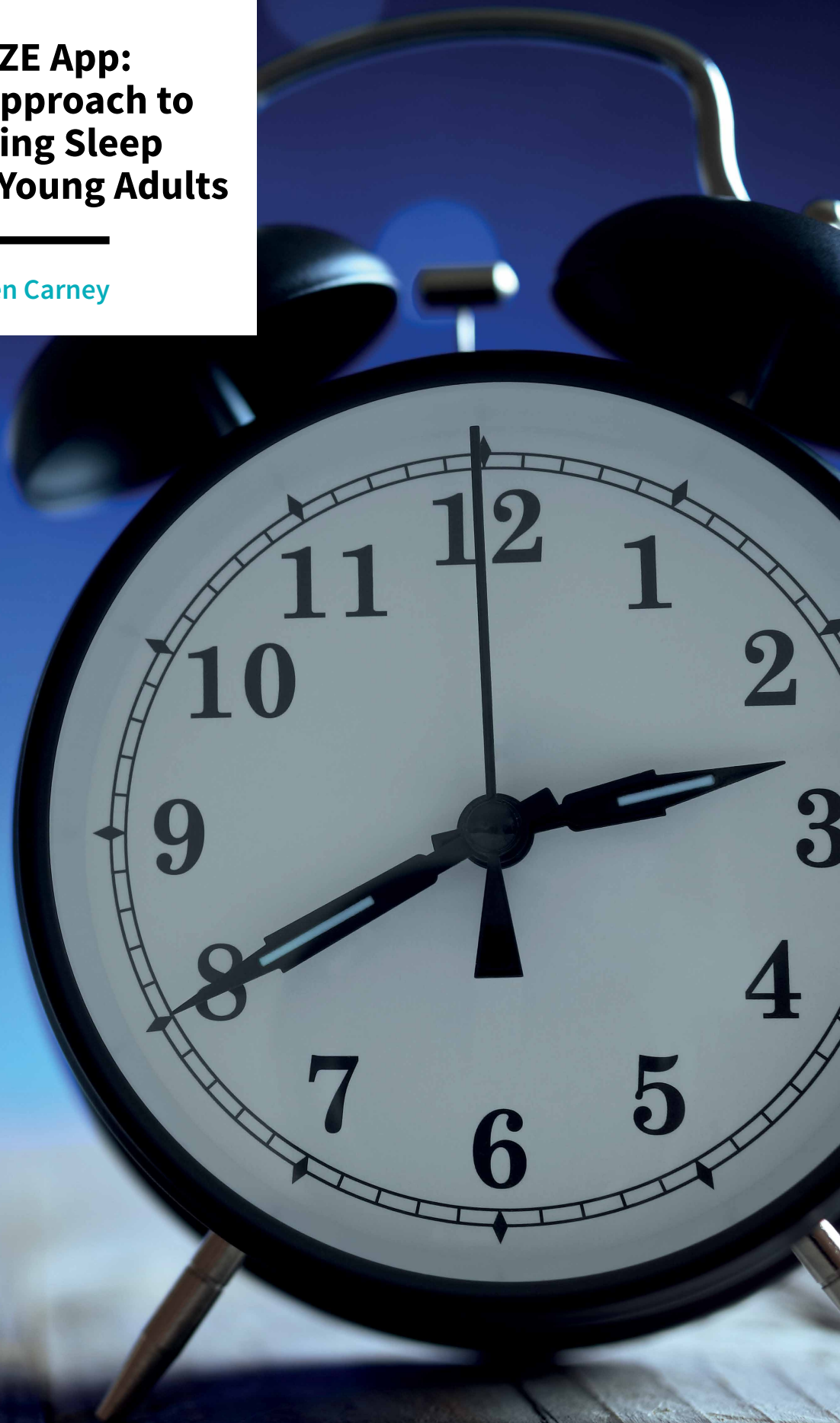


**The DOZE App:  
A Unique Approach to  
Overcoming Sleep  
Problems in Young Adults**

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Dr Colleen Carney





# THE DOZE APP: A UNIQUE APPROACH TO OVERCOMING SLEEP PROBLEMS IN YOUNG ADULTS

Poor sleep is a common difficulty issue for teenagers and young adults worldwide. Unfortunately, the impact of poor sleep is substantial with clear links to mental health difficulties. **Dr Colleen Carney**, an Associate Professor and the Director of the Sleep and Depression Laboratory at Ryerson University, Canada, is committed to helping people sleep better. Dr Carney has recently turned her expertise to the development of an innovative app to alleviate sleep problems in teenagers and young adults.

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## Sleep Issues in Early Adulthood

Sleep problems are a significant issue in early adulthood, with around two-thirds of young adults reporting some sort of sleep issue. Typical issues include difficulty either falling or staying asleep, falling asleep at unhelpful times such as during the day, and feeling the need to sleep for extended periods when possible, such as weekends.

Teenagers are particularly susceptible to sleep problems due to their natural shift towards later sleep times and the requirement to maintain early rise times to attend school. This delayed circadian rhythm related to a teenager's sleep pattern is confounded by increased sensitivity to evening light and peers reinforcing activities that take place later in the day. As a result, teenagers can suffer from pathological levels of sleepiness and insomnia.

Insomnia is defined clinically as a difficulty falling asleep or staying asleep on a regular basis, and is associated

with an increased risk for poor mental functioning, depression, substance abuse, and even suicide. Indeed, over half of young adults who suffer from insomnia also have a mental health disorder. Studies have shown that treating insomnia directly can help manage or even prevent the onset of depression and other mental illnesses. It is therefore critical for the well-being of teenagers to find a way to improve their sleep and to encourage long-term good sleep habits.

## Cognitive Behavioural Therapy for Sleep

Dr Colleen Carney, an Associate Professor at Ryerson University and the Director of the Sleep and Depression Laboratory at the same institution, has developed with her team a free, evidence-based sleep app called 'DOZE' to help improve sleep in young adults.

Although we know that improving sleep benefits mood and alertness across the board, finding the most



appropriate intervention for young adults is particularly challenging. Current interventions targeted at adults are inappropriate as they do not address the pubertal shift towards later bedtimes, and treatments for children focus on parental control



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over bedtimes, which for teenagers, are overly prescriptive. The DOZE app addresses these gaps in the provision of sleep interventions for young adults by utilising self-management and principles of cognitive behavioural therapy (CBT), already known to be effective in improving sleep.

CBT is an evidence-based psychological intervention that assumes that changing thoughts, attitudes, and behaviour can have an impact on physiology, and the way people feel. Through identifying thinking that can be unhelpful and behaviours that have a negative impact on the problem, and teaching individuals the skills required to cope with health-related problems, CBT can be used to successfully treat a wide range of conditions including anxiety, depression, and insomnia.

However, there are multiple barriers for individuals when it comes to accessing CBT in its traditional face-to-face format. These include the lack of available professionals to administer sleep-specific CBT. In recent years, there has been increasing interest in the use of technology to remotely deliver psychological therapies on a large and readily accessible scale, including CBT.

Dr Carney and her colleagues saw that the development of a bespoke app that could be easily utilised on mobile devices such as smartphones, presented a unique opportunity to address the needs of teenagers and young adults in relation to improving their quality of sleep and subsequent well-being. In discussing this approach, Dr Carney explains that ‘we decided that we would use the technology they are drawn to and their natural inclination towards self-management.’

**Using Technology to Treat Sleep Problems**

Dr Carney’s app was originally developed in connection with Ryerson’s Chang School to track sleep in undergraduates. Initial feedback highlighted the importance of an app that is user friendly, and that also provides tips and tricks on how to improve sleep, in addition to functioning as a sleep diary.

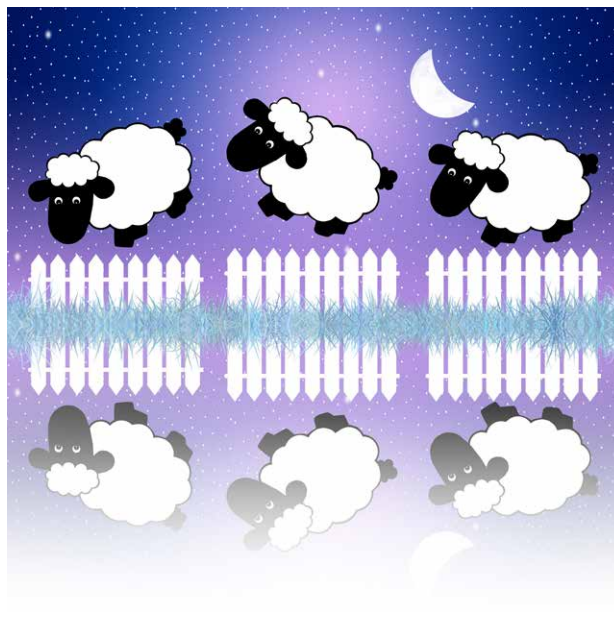
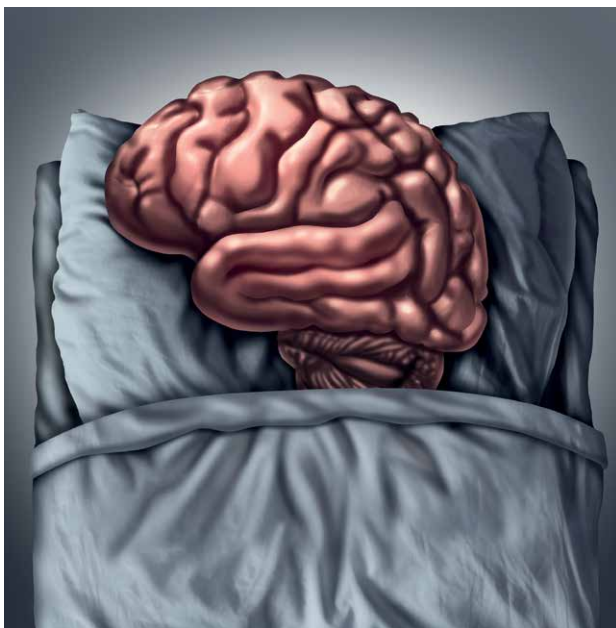
This work was useful for the subsequent development of DOZE. DOZE (**D**elivering **O**nline ‘**Z**ZZ’ with **E**mpirical support) utilises a web self-management system that allows young adults to access information and interactively learn

about strategies to promote sleep. The principle behind the app was to utilise evidence-based sleep treatments that young adults would want to use and that healthcare providers would be able to refer their patients to. To ensure ready access and engagement, DOZE combines web-based delivery to provide information about sleep and supplemental resources with a smartphone app that provides instant assessment and feedback on monitored sleep behaviours.

The DOZE app builds on elements from the initial app that assessed sleep habits and patterns, including time spent in bed, variability in sleep schedule, amount of sleep at night, amount of sleep in a 24-hour period, sleepiness, waking mood, daytime stress, and daytime fatigue rating. Additional features include the dose and timing of sleep-interfering substances, timing of devices with screens, and self-reported worry about sleep. The accompanying web-based interface provides access to information on evidence-based sleep-promoting treatments based on principles of stimulus control, sleep hygiene, counter arousal strategies, and calculating the optimal time-in-bed.



**‘By learning about your sleep system, there are some changes you can make in your habits that can get better results from your sleep system.’**



Studies confirm that it is most effective to provide young adults with immediate access to treatment resources, and an app is the most efficient way to provide this support. As such, the DOZE app ‘places evidence-based techniques into the hands of those who need it most’ notes Dr Carney. The main goal of CBT approaches to treat insomnia is to increase the young adult’s sleep self-efficacy. The DOZE app aims to help young adults identify patterns in their sleep patterns and devise sleep schedules that are consistent with their current sleep regulatory system.

### **Feasibility testing**

Dr Carney and colleagues have put DOZE through rigorous feasibility testing. In one trial, 51 young adults aged between 15 and 24 were enrolled. Although 77% of these participants did not meet the clinical cut-off for insomnia, 93% were not currently seeking professional help for their sleep problems. ‘Despite lots of fatigue, insomnia and struggles with mental health, very few were seeking professional help – this was the impetus for the app and self-management’ explains Dr Carney.

For four weeks, the participants used the app for sleep monitoring, goal setting, and as an information resource regarding sleep. Dr Carney and her team found that the most common goal set by participants was to reduce the variability of getting into and out of bed, followed by altering the time-in-bed based on feedback. The third was to reduce lingering in bed after the alarm. It was also found that young people used a variety of tips to help them achieve their goals. The most commonly accessed tips were on getting help winding down, how to live in an early bird’s world when you’re a night owl, help with fatigue management and getting up in the morning.

Although assessing efficacy was not the aim of this feasibility trial, it was found that the app did have a meaningful impact on sleep. By characterising participants as ‘good sleepers’ or ‘poor sleepers’ (above or below the insomnia cut-off threshold, respectively), Dr Carney and her team found that both groups saw improvements in sleep. In just two weeks of using the app, poor sleepers became good sleepers.

There were also improvements in daytime sleepiness, energy levels, and overall quality of life. This shows that by simply giving young people feedback on sleep and providing them with resources to learn how to improve sleep, then allowing them to make choices as to what they want to change can have a positive impact. Dr Carney believes that ‘By learning about your sleep system, there are some changes you can make in your habits that can get better results from your sleep system.’

### **Meeting the Sleep Needs of Young People**

Dr Carney is currently working with industry partner Ian Chalmers from Pivot Design to redesign and develop the app technology to make it more user friendly. Dr Carney’s ultimate goal is to make the app freely available to young people struggling with sleep. Dr Carney concludes by emphasising the autonomy that the app provides young adults, explaining ‘I think what is most important is that, they like it, they use it, and they set goals they can achieve, and it helps them sleep better.’





# Meet the researcher

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Dr Colleen Carney is an Associate Professor at Ryerson University and the Director of the Sleep and Depression Laboratory. Dr Carney is also the President of the Association for Behavioural and Cognitive Therapies (ABCT) Insomnia Special Interest Group. She is a leading expert on sleep with over 15 years' experience in behavioural sleep medicine and cognitive behavioural therapy (CBT) for the treatment of insomnia and its comorbid illnesses. Dr Carney has over 100 publications, including nine books on CBT for insomnia. Dr Carney is currently working on her 10th book titled *Goodnight Mind for Teens: Skills to Help You Quiet Noisy Thoughts and Get the Sleep You Need*, which is due to be released later this year. She is a recognised thought leader in this important field and her work is featured in many news outlets, including the New York Times. Dr Carney was recently featured on the Netflix series *A User's Guide to Cheating Death*. Dr Carney trains students and professionals in CBT and is a passionate advocate for improving the access to evidence-based treatments for insomnia.

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Dave Brennan, Pivot Design (Designer)  
Melvyn Loa, Pivot Design (Programmer)

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## FURTHER READING

CE Carney, 2020, *Goodnight Mind for Teens: Skills to Help You Quiet Noisy Thoughts and Get the Sleep You Need*, New Harbinger Press, Oakland, CA.

