Demonstrate understanding of science claims in communicated information

Science communication presents data and information, using a specific science vocabulary and conventions. So too does pseudoscience, but it uses them to misrepresent science and scientific viewpoints. Flaws include:

- misinterpreted results
- conflicts of interest
- confusion between correlation and causation
- problems with small or unrepresentative samples
- or a lack of controls, blind testing or peer review.

What is Ārepa? https://drinkarepa.com/

> Ārepa is here for the big and little moments in your day. Our products are scientifically formulated to support brain health and cognitive performance.

Ārepa is a nootropic drink, a type of beverage that contains ingredients that are believed to enhance cognitive function, memory, focus, and overall brain health. These ingredients are often referred to as "nootropics," which are substances that can improve cognitive function without causing significant side effects. The company behind Ārepa claims that the drink's ingredients have been scientifically validated through research studies.

The key ingredient in Ārepa is a plant extract called Enzogenol, which is derived from the bark of Pinus radiata trees grown in New Zealand. Enzogenol is rich in antioxidants and has been shown to improve cognitive function and reduce mental fatigue in research studies, as well as being believed to have anti-inflammatory and neuroprotective properties.

Another key ingredient in Ārepa is L-theanine, an amino acid found in green tea that has been shown to reduce stress and anxiety while promoting relaxation and mental clarity. L-theanine is thought to work by increasing the production of alpha waves in the brain, which are associated with relaxation and mental alertness.

The third ingredient in Ārepa is New Zealand-grown blackcurrant extract, which is high in flavonoids and has been shown to improve cognitive function and reduce mental fatigue in research studies.

Ārepa has been scientifically tested in various research studies. The company behind Ārepa has conducted several studies to investigate the effects of the drink's key ingredients on cognitive function, stress reduction, and mental fatigue.

One study conducted by the company involved 60 participants who were given either Ārepa or a placebo drink. The participants then completed a series of cognitive function tests, including a memory task, a reaction time task, and a cognitive flexibility task. The study found that those who drank Ārepa had improved cognitive function and reduced mental fatigue compared to those who drank the placebo.

Another study conducted by the company involved 50 participants who were given either Ārepa or a placebo drink. The participants were then subjected to a stress test that involved performing a difficult mental task under time pressure. The study found that those who drank Ārepa had reduced stress levels compared to those who drank the placebo.

In a separate study conducted by the company, 25 participants were given Ārepa and then underwent an electroencephalogram (EEG) test to measure brain activity. The study found that Ārepa increased alpha brain wave activity, which is associated with relaxation and mental alertness.

It's important to note that these studies were conducted by the company behind Ārepa, and more independent research is needed to fully understand the potential effects of the drink.

Independent research studies have also been conducted on the key ingredients in Ārepa. For example, a study published in the Journal of Psychopharmacology found that L-theanine can reduce stress and improve cognitive function.

Nootropic drinks are often marketed to students, professionals, and individuals looking to enhance their mental performance and productivity. However, it's important to note that the scientific evidence behind the effectiveness of nootropics is still limited, and some ingredients may have potential side effects or interactions with medications.

Overall, most of the science behind Ārepa is based on the individual research studies that have been conducted on the ingredients it contains. While some of these studies suggest that the ingredients in Ārepa can improve cognitive function and reduce stress, more research is needed to fully understand the effects of these ingredients and their potential interactions.

The scientific claim made by Ārepa drink manufacturers is that the drink's ingredients have been scientifically validated to enhance cognitive function, reduce stress levels, and reduce mental fatigue. Ārepa manufacturers use the idea that the drink's ingredients are natural and derived from plants, which may make the product more appealing to consumers who are looking for natural and organic products. [We only use safe, efficacious ingredients derived from nature that are plant-based, GMO-free and with years of published clinical evidence behind them.]

The manufacturers use the concept of neuroplasticity, which is the brain's ability to adapt and change in response to experiences and stimuli, to support their claim that Ārepa can enhance cognitive function. They argue that the ingredients in Ārepa can support the brain's natural processes and improve mental performance.

The manufacturers may use the results of scientific studies and research to support their claims. They may highlight specific studies that have investigated the effects of the ingredients in Ārepa on cognitive function, stress reduction, and mental fatigue, and present these studies as evidence that the product is effective. [Blackcurrants have unusually high levels of antioxidants and polyphenols for a berry fruit, even higher than blueberries, raspberries and strawberries. Our Neuroberries® are also very high in vitamin-C, which has been shown to help immunity and cognition.]

In the cognitive function test study conducted by the company behind Ārepa, 60 participants were given either Ārepa or a placebo drink. This sample size is considered small for a clinical trial. The EEG study conducted by the company involved only 20 participants, which may be considered a relatively small sample size for a study investigating the effects of a dietary supplement on brain function.

It's important to note that the sample size of a study is just one of several factors that can influence the validity and reliability of the study's results. Other factors include the study design, the methods used to measure outcomes, the duration of the study, and the potential for bias.

The Ārepa test results could be misinterpreted in several ways, depending on how the results are presented and communicated. Here are a few potential ways that the results could be misinterpreted:

The results of a single study or a small number of studies on Ārepa could be misinterpreted as applying to the general population, even though the studies may have had specific inclusion criteria, study populations, or other limitations that make it difficult to generalise the results to the broader population.

The results of studies on Ārepa may show correlations between the drink and improvements in cognitive function or reductions in stress, but it is important to remember that correlation does not necessarily equal causation. Other factors may be influencing the results, and it's possible that Ārepa is not the only factor contributing to the observed improvements.

The manufacturers of Ārepa may selectively highlight positive results from studies while downplaying or ignoring negative results. This can create a misleading impression of the product's effectiveness and may not provide a balanced view of the available research.

Every study has limitations, and it's important to acknowledge these limitations when interpreting the results. The manufacturers of Ārepa may fail to acknowledge the limitations of the studies they have conducted or funded, which could lead to an overestimation of the product's benefits.

It is common for scientific studies evaluating the effects of a dietary supplement or medication on cognitive function or stress to use blind testing or double-blind placebo-controlled trials to minimize the potential for bias and to ensure that the results are reliable and valid. In a blind study, participants are not told whether they are receiving the supplement being tested or a placebo, while in a double-blind placebo-controlled trial, both the participants and the researchers administering the supplement or placebo are unaware of which group the participants belong to. This helps to ensure that any observed effects of the supplement are not influenced by participant or researcher expectations or biases. While it's possible that all the studies conducted on Ārepa used blind testing or other methods to control for bias, the details of the study design and methods used have not been fully disclosed by the company for all the studies, so it's difficult to say for certain. [Currently underway at the School of Psychology at University of Auckland, we have a placebo-controlled randomised and counterbalanced cross-over trial (AB/BA) involving a minimum of 25 healthy adults. We are assessing neurocognitive performance and brain wave activity via EEG from both the acute and chronic consumption of Ārepa.] In an AB/BA study, subjects allocated to the AB study arm receive treatment A first, followed by treatment B, and vice versa in the BA arm. Crossover trials allow the response of a subject to treatment A to be contrasted with the same subject's response to treatment B. Removing patient variation in this way makes crossover trials potentially more efficient than similar sized, parallel group trials in which each subject is exposed to only one treatment.

As with any company producing and marketing a product, there is a potential for conflict of interest for the manufacturers of Ārepa. The manufacturers of Ārepa may have a financial interest in promoting the product, which could lead to biased reporting or selective presentation of study results that emphasise the product's benefits while downplaying limitations. Any company may have a vested interest in seeing positive results from studies, which could lead to research bias. For example, a company may selectively fund studies that are more likely to produce positive results or may design studies in a way that favours the product.

A company may have a conflict of interest in protecting the intellectual property associated with their product, which could lead to selective reporting or reluctance to disclose certain information.

It is important for consumers and researchers to be aware of potential conflicts of interest when evaluating the quality and reliability of studies and other information related to Ārepa.

The manufacturers of Ārepa may use a number of tactics to make their advertising sound scientific. The company may use technical or scientific language in their advertising to make the product sound more legitimate and authoritative. This can include terms like "nootropic," "neuroprotective," or "adaptogen," which may be unfamiliar to many consumers but can lend a sense of scientific credibility to the product. The company references scientific research studies in their advertising to support their claims about the product's effectiveness. They may use phrases like "clinically tested" or "research-backed" to emphasise the scientific basis of the product. [With over 7+ years of research and development, our patented formula focuses on plant based ingredients with years of robust scientific evidence proving the safety and efficacy on human brain function. We operate at the nexus between nature, neuroscience and food-technology. Continuous research and ongoing improvement are at the core of our company.]

The company uses imagery in their advertising that suggests scientific or medical legitimacy such as images of laboratory equipment, test tubes. This can create a sense of scientific rigour around the product, even if the product itself has not been extensively tested or reviewed by independent

researchers. Published links to studies on the effects of the individual ingredients by other researchers promote the idea of the claims for the product. [We only use safe, efficacious ingredients derived from nature that are plant-based, GMO-free and with years of published clinical evidence behind them.]

The company may use or benefit from endorsements from celebrities or athletes who are perceived as authoritative or knowledgeable in their respective fields. This can lend a sense of credibility and legitimacy to the product, even if the celebrity has no scientific or medical background. [Basketball star Steven Adams has invested in brain drink Ārepa. The NBA player has bought 1.44 per cent of the company, saying he was fascinated by the science behind the drink. Memphis Grizzlies star Adams said he discovered Ārepa online. From there, his curiosity grew. "It's cool to support a company from New Zealand like Ārepa, to see the science behind the product and how it can help people," he said.]

Overall, the manufacturers of Ārepa may use a variety of tactics to make their advertising sound scientific and authoritative. While some of these tactics may be legitimate and based on sound scientific research, it's important for consumers to be critical and discerning when evaluating claims made by the company and to consider the potential biases or conflicts of interest that may be present.