Organizing community outreach events for alcohol science

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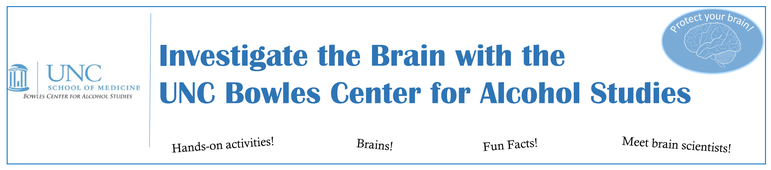
The Bowles Center for Alcohol Studies has organized several community outreach events focused on neuroscience and alcohol effects on the brain. These events promote public awareness of research and enthusiasm for science, as well as provide opportunities for scientists to communicate their research to a broad audience.



As researchers, it is important to discuss our research with the public, and these outreach activities give our scientist volunteers that opportunity while bringing the science to the community.

1. Pick a topic.
For each event, we pick a general topic that provides the framework for our conversations about alcohol and the brain. Past topics include brain development, brain protection (skull, CSF) and sensation versus perception. These topics are accessible to broad audiences – from preschoolers to adults – and can tie to alcohol through information or props, e.g. distortion goggles that simulate different blood alcohol levels.

2. Pick a venue.
We partner with a science museum or expo that will draw visitors. Libraries, schools, churches and clubs are also good venues.

MUSEUM of LIFE + SCIENCE

MOREHEAD PLANETARIUM & SCIENCE CENTER

SCIENCE FESTIVAL

3. Gather activities.
There are many great resources available online. For example, "sensation versus perception" can be illustrated via sensory illusions, which set the stage for the sensory illusion of the alcohol distortion goggles. An excellent prop for neuroscience is a real brain.

The human brain that we use is the star of the show, but a great alternative is a sheep brain purchased from a science supply store.

4. Recruit volunteers.
Universities are full of scientists at all levels who enjoy talking about neuroscience! Many of our volunteers are students, postdocs, staff or faculty in the Center, but we also recruit undergraduates. We recruit through listservs and word of mouth, and organize by using a web-based sign up.

5. Provide training.
Our activities are interactive and designed to promote conversation rather than "instruction." We give our volunteers detailed written guidelines before the event that include questions they can use to engage the visitors.

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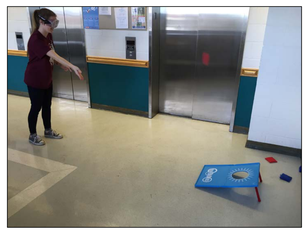
Blood Alcohol Levels

Bean bag toss – under the influence
We have distortion goggles that shift your perception in ways that mimic high blood alcohol levels – can you do a simple bean-bag toss with these goggles on? Here's a suggested action plan:

- Have the visitor try the bean bag toss without the goggles. (If it is very busy, skip this step.)
- Have them try again with a pair of goggles. They will almost surely throw the bag to the side of the goal. It is difficult for adults to compensate for this, but easier for kids. Everyone finds it hilarious.
- Plot their success on the graph. We'll have success rate on the one axis with simulated BEC on the other axis.
- Optional – if there is space, you can put a line on the floor with masking tape and ask them to walk on the line, or very close to the line without touching it (which may be harder).



Points of discussion:

- How do you feel with the goggles on? (dizzy, uneasy, weird)
- Why couldn't you throw as well with the goggles on as you did without them? (they made things look funny, I can't keep my balance…)
- These goggles try to mimic how drugs like alcohol can affect your sensations. What sensation are the goggles changing for you? (my vision, how I see, my balance, moving)
- Feel free to expand on this theme as you see fit. With adults, you can move into the conversation of how even small amounts of alcohol can slow reaction time and impair driving.

Progressive effects of alcohol[2]

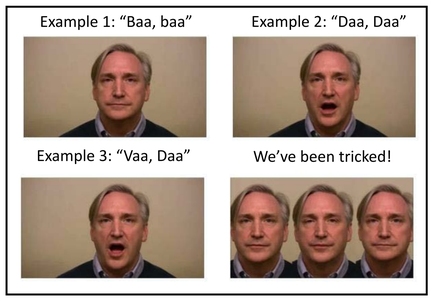
BAC (% by vol.)	Behavior	Impairment
0.010–0.029	▪ Average individual appears normal	▪ Subtle effects that can be detected with special tests
0.030–0.059	▪ Mild euphoria ▪ Relaxation ▪ Joyousness ▪ Talkativeness ▪ Decreased inhibition	▪ Concentration
0.06–0.09	▪ Blunted feelings ▪ Disinhibition ▪ Extroversion	▪ Reasoning ▪ Depth perception ▪ Peripheral vision ▪ Glare recovery
0.10–0.19	▪ Over-expression ▪ Emotional swings ▪ Anger or sadness ▪ Boisterousness ▪ Decreased libido	▪ Reflexes ▪ Reaction time ▪ Gross motor control ▪ Staggering ▪ Slurred speech ▪ Temporary erectile dysfunction ▪ Possibility of temporary alcohol poisoning
0.20–0.29	▪ Stupor ▪ Loss of understanding ▪ Impaired sensations ▪ Possibility of falling unconscious	▪ Severe motor impairment ▪ Loss of consciousness ▪ Memory blackout
0.30–0.39	▪ Severe central nervous system depression ▪ Unconsciousness	▪ Bladder function ▪ Breathing ▪ Dysequilibrium

For volunteer instructions, please email Donita Robinson at DLR@unc.edu

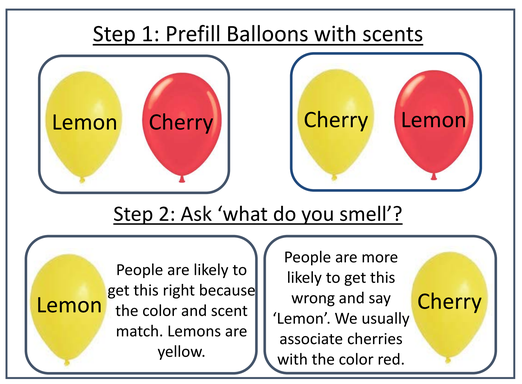
Brain tricks – Sensation and Perception

Sound Illusions. The McGurk effect shows us how what we see– lip reading – can override what we hear. It's illustrated with a video of a person saying a sound, and then they might switch to another sound, in which you can hear the difference. But guess what? The person only said one word the entire time!

Lead visitors through questions: What happens when you close your eyes? Why didn't it seem funny to us that the sound didn't match what we saw when we were watching the video? When would it be useful to be able to hear with our eyesight?



Smell Illusions. This activity demonstrates demonstrate a Stroop-like effect in which color affects what you smell. When you put an extract (e.g. lemon) into a balloon, the odor is able to pass through the latex. Our associations of scents and colors can influence what we think we smell. Participants come up to the station and are asked to tell us what scent they smell. A yellow balloon has been filled with a scent (lemon) and then a second yellow balloon is filled with a different scent (cherry). Most people will identify the first scent correctly as lemon, but they will also say that the second balloon (filled with cherry) also smells like lemon! We then tell them that their brain may have 'tricked' them- we usually identify the smell of lemon with the color yellow. If they identified both scents correctly, we can talk about how their brain didn't get tricked but that some people get the scents incorrect and why this may happen in the brain.



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Protect the Brain!

Name that skull. The first protection of the brain is a bone – the skull. The museum has several animal skulls (including a baby human and a tooth whale!!). Visitors can guess what animal the skull came from, look at the surface of the skull up close with a microscope probe, and look at human skull models.

Mr. Egghead experiment. The last station illustrates how cerebrospinal fluid protects the brain. We will have raw eggs (the *brain*) that we put in plastic bags (*meninges*) and then into plastic Tupperware containers (the *skull*). When they shake the egg in the Tupperware, ask what they hear – does that sound good for the brain? We'll show them how to even smash the egg in the Tupperware. Evidently the brain is not sufficiently protected.

Next, we give them a new egg, baggie and clean Tupperware. This time they fill the container with water (*cerebrospinal fluid*). Now what do they hear? Can they break the egg?

Public health messages. The exhibit shows how the body protects the brain, but we can do things to protect our brains, too. As we chat with kids and adults, we can reinforce healthy behaviors: wearing helmets, eating healthy food, protecting our brains from drugs and alcohol (or excessive alcohol in the case of adults).

Comment from graduate student: "My favorite part was talking to a teenage girl who had so many questions about how the brain worked that her parents had to literally drag her away from our booth. I get very excited to see others with that type of enthusiasm for brain science. We collectively encouraged her to ask more questions and to even consider a career in science. I also really loved seeing that the children could make an instant connection with the hands on experiment about protecting their brain (egg)."

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