

Alcohol and Dehydration

FOCUS

Example of 20 point Comic San MS.

Alcohol and Dehydration Study:

Robert B. Kauffman, Ph.D.

7 Hilltop Drive

Frostburg, MD 21532

h: (301) 689-8957

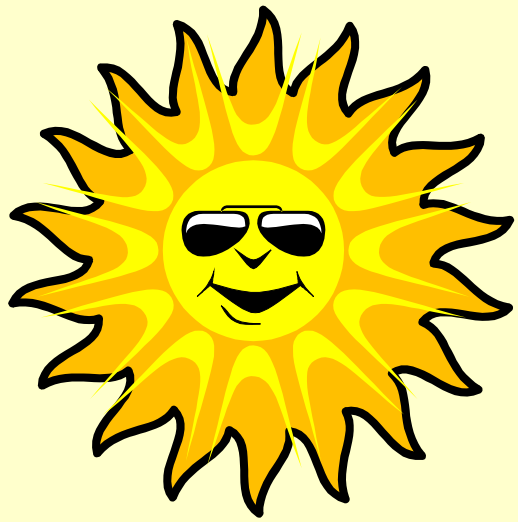
o: (301) 687-4474

e: rkauffman@frostburg.edu

The information contained in this presentation was conducted under the supervision of the author and Dr. Art Siemann by Jeanette Sweitzer as part of her unfinished and unpublished master's thesis at Frostburg State University.

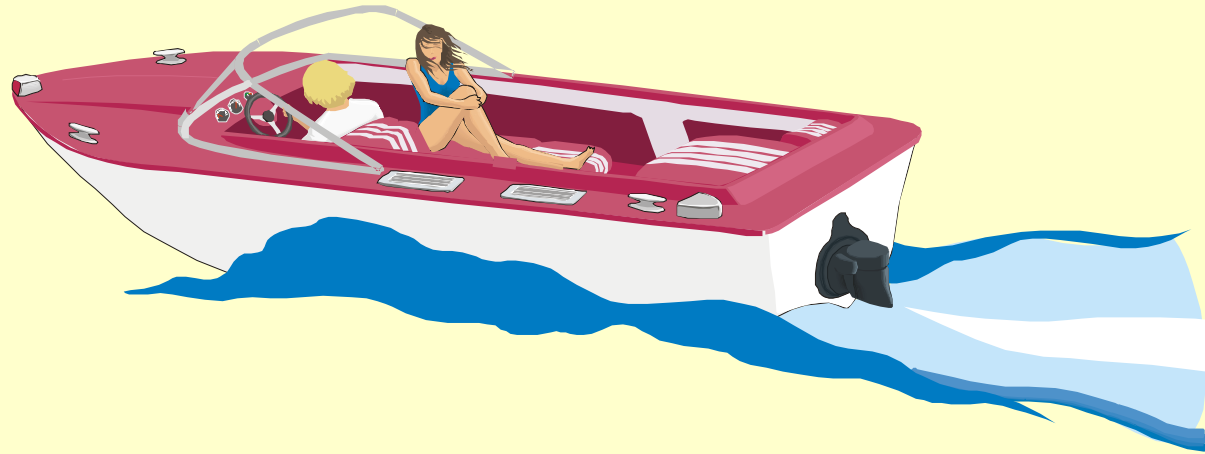
This study examined the effects of dehydration on blood alcohol levels.

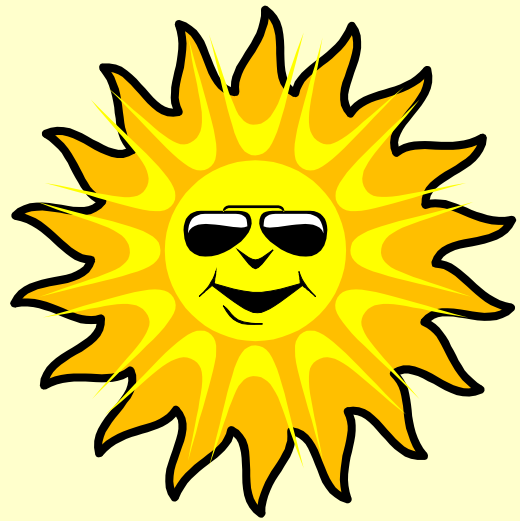




Stressors:

- Boaters expose their bodies to the stressors (**wind, waves, sun, alcohol**) which work in combination with each other to stress the body
- The literature suggests that physiologically, alcohol and dehydration have many similar effects on the body
- Is it a problem for boaters?
(next slides)

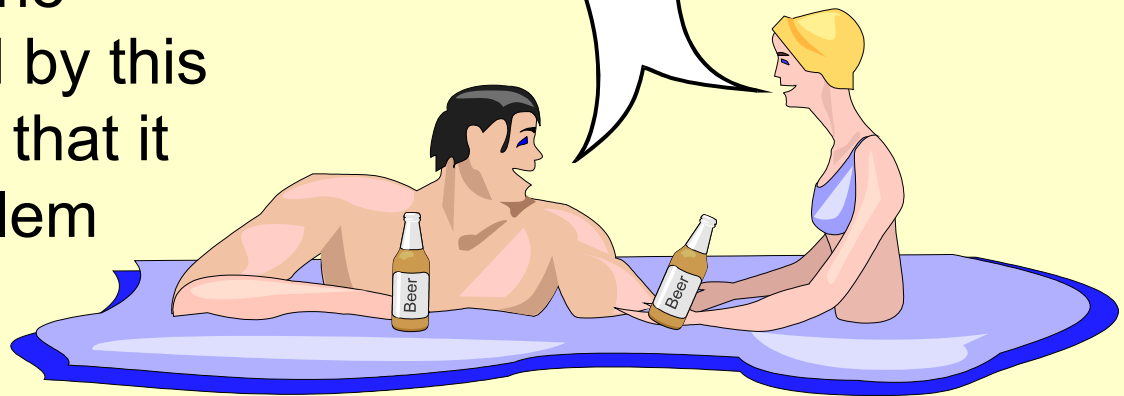


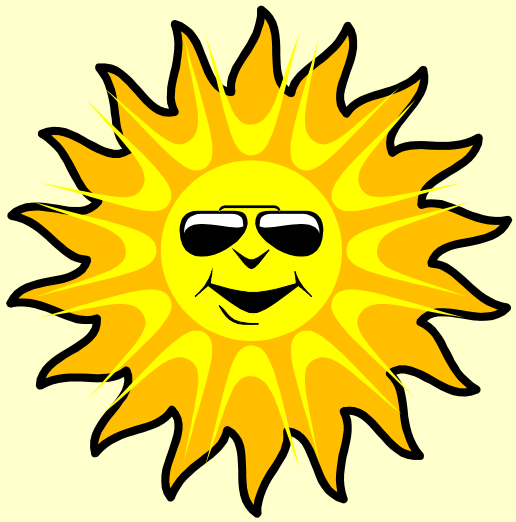


Is it a Potential Problem with Wader/Swimmers? -

- Is alcohol and dehydration a problem on the water? One study completed by this author suggests that it is indeed a problem

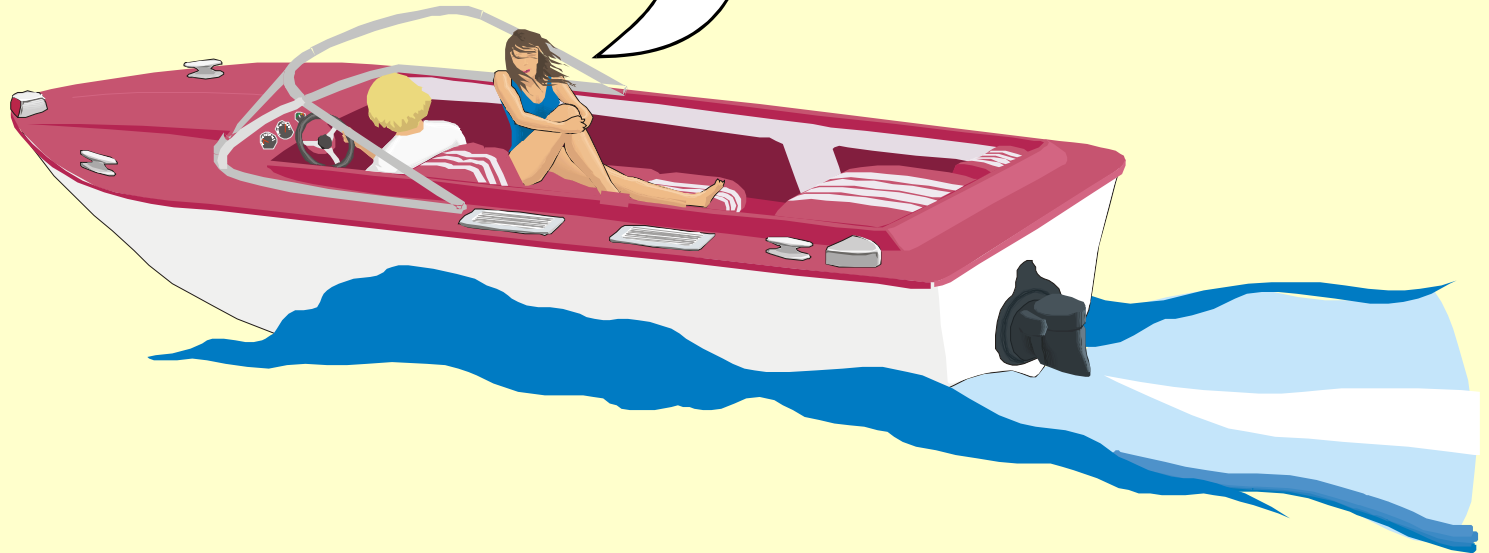
In the Potomac River study, three out of ten (30%) of us admitted to consuming alcoholic beverages while on the river.

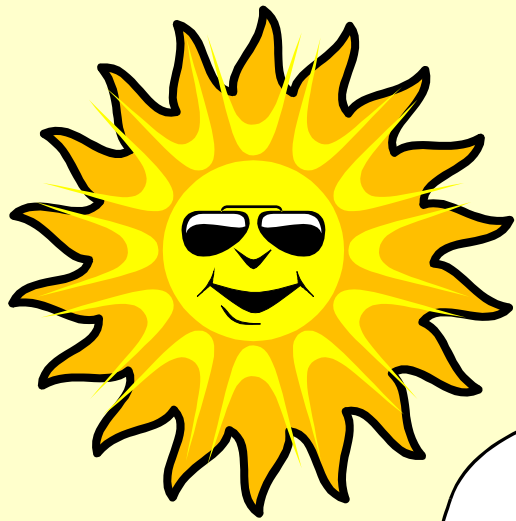




Is it a Potential Problem with Power Boaters? -

In the Potomac River study 30% of the power boater admitted to drinking alcohol while on the river.

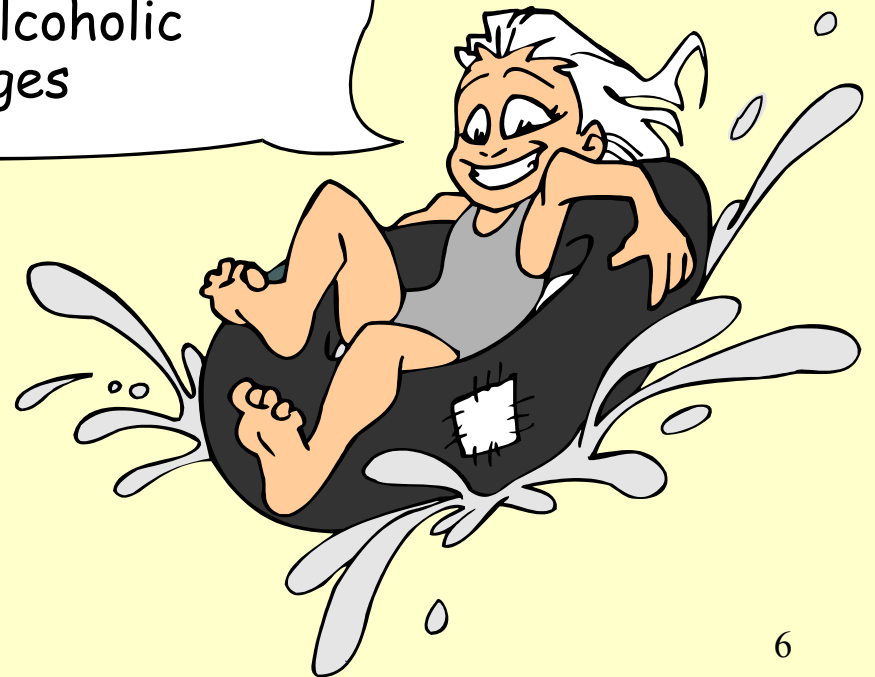


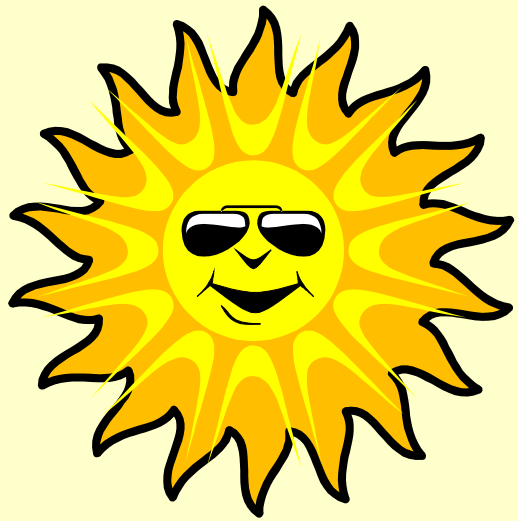


Is it a Potential Problem with Tubers? -

In the Potomac River study, two out of five (40%) of us admitted to consuming alcoholic beverages

- In this study, which was on one major river, over three out of five river users admit to consuming alcoholic beverages on the river.





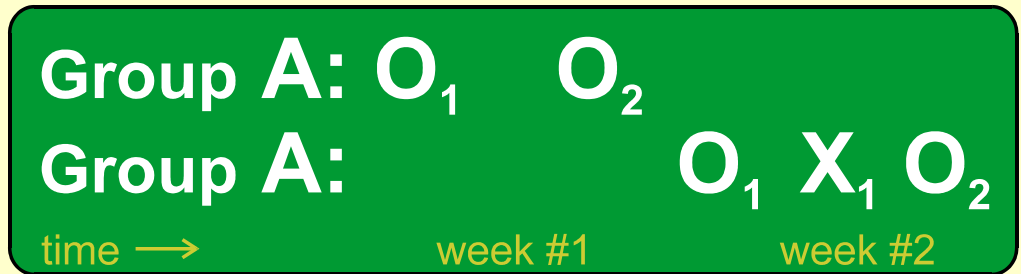
Focus of This Study -

- To test the following question:
Is the Blood Alcohol Content (BAC) for subjects different when they are dehydrated?



Experimental Design:

- Pre-Posttest Control Group using the same subjects with a week to separate the two treatments
- Items on right (subjects, observations, treatment, and analysis are on following slides).



Design: **Pre-Posttest Control Group**
Group A: Nine male college students
 O_1 : **Observation** – Blood Alcohol Content (BAC) using breathalyzer, whole blood
 X_1 : **Treatment** – Dehydration

Subjects:

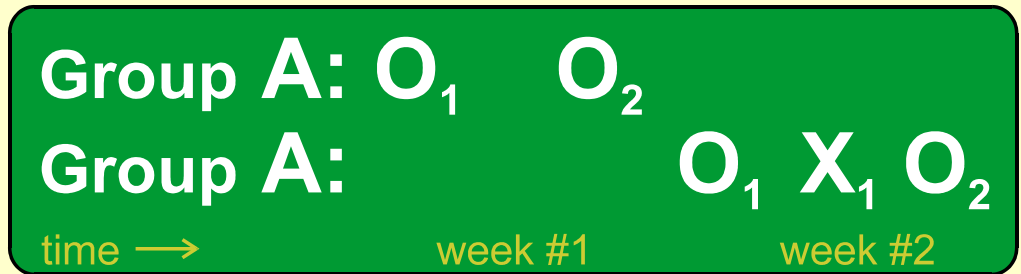
- Nine male graduate students
- Between 21 and 25 years of age
- Frostburg State University students
- Convenience (purposive) sample
- Not representative of general population ...
- Test the concept.



Design: **Pre-Posttest Control Group**
Group A: Nine male college students
O₁: **Observation** – Blood Alcohol Content (BAC) using breathalyzer, whole blood
X₁: **Treatment** – Dehydration

Observations:

- Blood Alcohol Content (BAC) using
- Breathalyzer (9 students)
- Whole blood (6 students)
- Observations taken every 15 minutes until BAC peaked
- Highest value used.



Design: **Pre–Posttest Control Group**
Group A: Nine male college students
 O_1 : **Observation** – Blood Alcohol Content (BAC) using breathalyzer, whole blood
 X_1 : **Treatment** – Dehydration

Treatment:

- Mild dehydration – less than 3%-4% by body weight
- Weighed subjects before dehydrating them; weighed them during and after also
- Enter sauna until 3% body loss by weight or 30 minutes (whichever came first)
- Average loss - 2%
- Low 1%; high 3.5%.

Average Weight of Subjects before and after Dehydration

N=9	Weight (lbs)
Dehydration	172.8
No Dehydration	169.5

Paired t-test significant at the .001 level

Analysis:

Multiple T-Tests

Breathalyzer - (#1) No dehydration versus dehydration

Whole Blood – (#2) No dehydration versus dehydration

No Dehydration – (#3) Breathalyzer versus whole blood

Dehydration – (#4) Breathalyzer versus whole blood.

Analysis	No Dehydration	Dehydration
Breathalyzer N=9	BAC	BAC
Whole Blood N=6	BAC	BAC

Paired t-tests

Effect of Dehydration on BAC Using a Breathalyzer (#1):

- Nine subjects
- Using a Breathalyzer average BAC of .04
- Same dehydrated subjects had average BAC of .07
- Dehydration resulted in a 75% increase in BAC
- Significant at .001 level.

Effect of Dehydration on BAC Using a Breathalyzer

N=9	Blood Alcohol Content (BAC)
	Breathalyzer
Dehydration	.07
No Dehydration	.04

Paired t-test significant at the .001 level

Effect of Dehydration on BAC Using Whole Blood (#2):

- Six subjects
- Using whole blood average BAC of .04
- Same dehydrated subjects had average BAC of .05
- Dehydration resulted in a 34% increase in BAC (BAC of .041 and .055)
- Significant at .001 level.

Effect of Dehydration on BAC Using a Breathalyzer

N=9	Blood Alcohol Content (BAC)
	Whole Blood
Dehydration	.05
No Dehydration	.04

Paired t-test significant at the .001 level

Comparison of Breathalyzer & Whole Blood - Non-Dehydrated Subjects (#3):

- Six subjects
- Comparison for non-dehydrated subjects
- Using breathalyzer average BAC of .04
- Using whole blood average BAC of .04
- No difference statistically
- Expected results.

Breathalyzer and Whole blood for Non-Dehydrated Subjects

N=6	Blood Alcohol Content (BAC)
	No Dehydration
Breathalyzer	.04
Whole Blood	.04

Paired t-test not significant at the .05 level

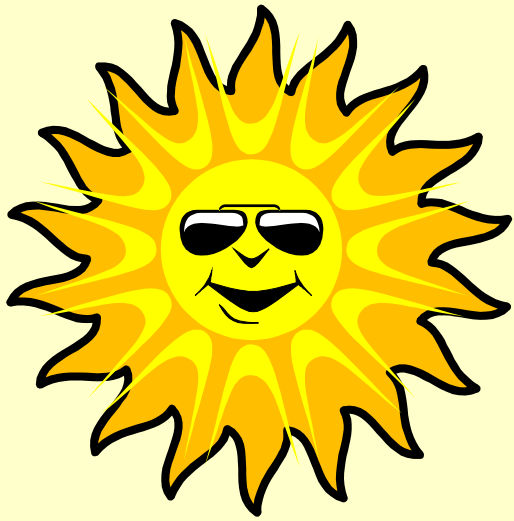
Comparison of Breathalyzer & Whole Blood for Dehydrated Subjects (#4):

- Six subjects
- Comparison for dehydrated subjects
- Using breathalyzer average BAC of .06
- Using whole blood average BAC of .05 (e.g. .054)
- No difference statistically.

Breathalyzer and Whole blood for Dehydrated Subjects

N=6	Blood Alcohol Content (BAC)
	No Dehydration
Breathalyzer	.06
Whole Blood	.05

Paired t-test not significant at the .05₁₆ level



Findings:

- Dehydration affected BAC levels.
- In the study, dehydration resulted in a statistically significant 75% increase in BAC over non-dehydrated subjects
- A statistically significant 35% increase when measured using whole blood
- Differences between breathalyzer and whole blood for dehydrated subjects but not statistically significant.



It is late afternoon after a hot day in the sun. We are slightly dehydrated. A drink which would normally raise our BAC to a .04 level, may easily raise it to over .07.

The End:

