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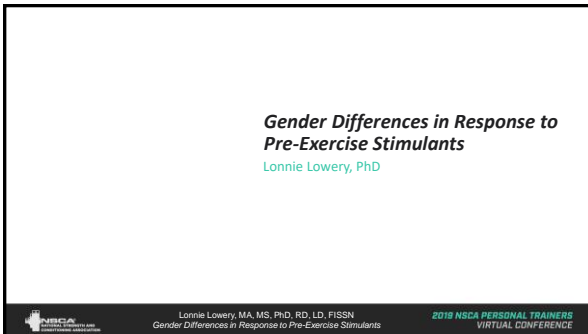
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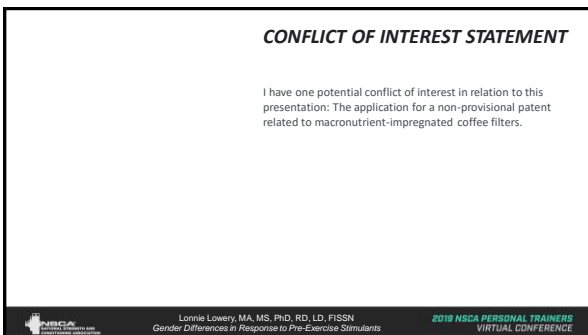
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## Coffee & Caffeine: Popularity / Market



- Coffee: 83% of Americans drink it.<sup>1</sup>
- 1/3 of Americans drink specialty coffees.<sup>1</sup>

1. National Coffee Association, 2013



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## Coffee and Caffeine: Variation in products

"Another notable find is the wide range of caffeine concentrations (259-564 mg/dose) in the same coffee beverage obtained from the same outlet on six consecutive days."

-McCusker, Journal of Analytical Toxicology, 2003



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**Women: Not slightly smaller men**

How do they differ regarding caffeine responses?

Body size and “competing” hormones affect dosing and caffeine breakdown in the bloodstream.

- Relative vs. absolute dosing
- Relative vs. absolute performance
- External validity
- Estrogen (natural or birth control)
- Coffee vs. energy drink vs. pill vs. gum
- Timing with exercise



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**Women: Not slightly smaller men**

How do they differ regarding caffeine responses?

Body size and “competing” hormones affect dosing and caffeine breakdown in the bloodstream.

- “Consistent with previous results found in younger women, these results indicate that exogenous estrogen in older women may inhibit CYP1A2-mediated caffeine metabolism.”  
-Pollock, 1999



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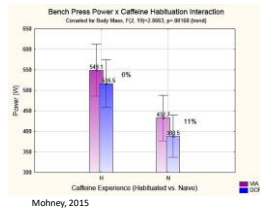
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**Women: Other issues**

How do they differ regarding caffeine responses?



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### Practical Applications

"Pre-workout" use in mixed-sex environments

1. Women are not slightly smaller men.
2. Mental, physical, and performance comparisons between sexes can be done by considering **absolute** and **relative comparisons** (or statistical adjustments for body size or baseline).
3. Comparatively-elevated **serum caffeine** and adrenaline (**epinephrine**) in women support careful comparisons showing women may "get more out of a cup of coffee" (underlying mechanisms).
4. Caffeine absorption across the oral mucosa, such as with **caffeine gum** is rapid, perhaps particularly in women.

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