

# The Effects of Leg Crossing and Applied Tension on Vasovagal Symptoms and Blood Donor Return: A Randomized Trial

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# Applied Tension

- Behavioural technique: tensing and releasing arm and leg muscles while breathing steadily (Ost & Sterner, 1984, 1987)
- Effective intervention for both blood phobics/non-phobics exposed to medical stimuli and undergoing medical interventions
  - Blood donation a useful setting for investigation
  - Reduced symptoms are noted in blood donors practicing AT
- If it is effective in part through physiological processes (maintain HR & BP and cerebral perfusion) this may be from facilitated venous return from the lower body

# Leg Crossing: A Particularly Important Component?

- Evidence suggests that leg crossing may be an integral component to the success of AT and donors responses (both symptomatically and behaviorally)
1. Leg muscle tension is a key part of AT (Ditto et al. 2007)
  2. In passive head-up tilt situations, leg crossing facilitates the effects of muscle (applied) tension (Krediet et al. 2002, 2006)
  3. Leg crossing has been found to increase cerebral oxygenation in the laboratory and in the clinic (France et al. 2006, Kowalsky 2011)

# Symptoms and Donor Return

- Experiencing vasovagal reactions during blood donation significantly reduces blood donor return
  - So would decreasing vasovagal reactions/ simply the act of using AT not increase retention?
- Some of our recent research indicates that perhaps AT does increase donor return
  - Participants who used a version of deconstructed AT were more likely to return in the following year (Ditto et al. 2007)
  - Retrospective study found increased retention of participants who were ambivalent about needles and practiced AT (Ditto et al. 2010)

# Methods

## Participants

- Recruited at Hema Quebec (blood donor agency) clinics
- English speaking
- Relatively new blood donors

	Control	Regular AT	Leg Crossing AT
N = 404	140	133	131
Mean age	20.7 (3.2)	20.4 (2.5)	21.0 (3.5)
Sex	64.2% female	51% female	54.5% female
Mean number of previous donations	2	2.5	2

# Procedure

- Participants were recruited upon arrival at blood donor clinic
- Completed questionnaires, physiological measures (BP/HR) and then were randomly assigned
- AT participants learned using a 2-minute instructional video and practiced for 5 minutes
- Crossing group was asked to cross their legs while practicing AT

# Blood Donation Procedure

- Typical blood donation procedure with 450mL of blood drawn
- Practiced AT during donation
- Repeated questionnaires, after blood draw and the BDRI
  - Basic Demographic Questionnaires
    - Participant ratings of likelihood of subsequent donations
    - Permission to collect numbers of actual future donations
  - Blood Donation Reaction Inventory
    - 11-item inventory administered after blood donation to assess subjective physiological reactions

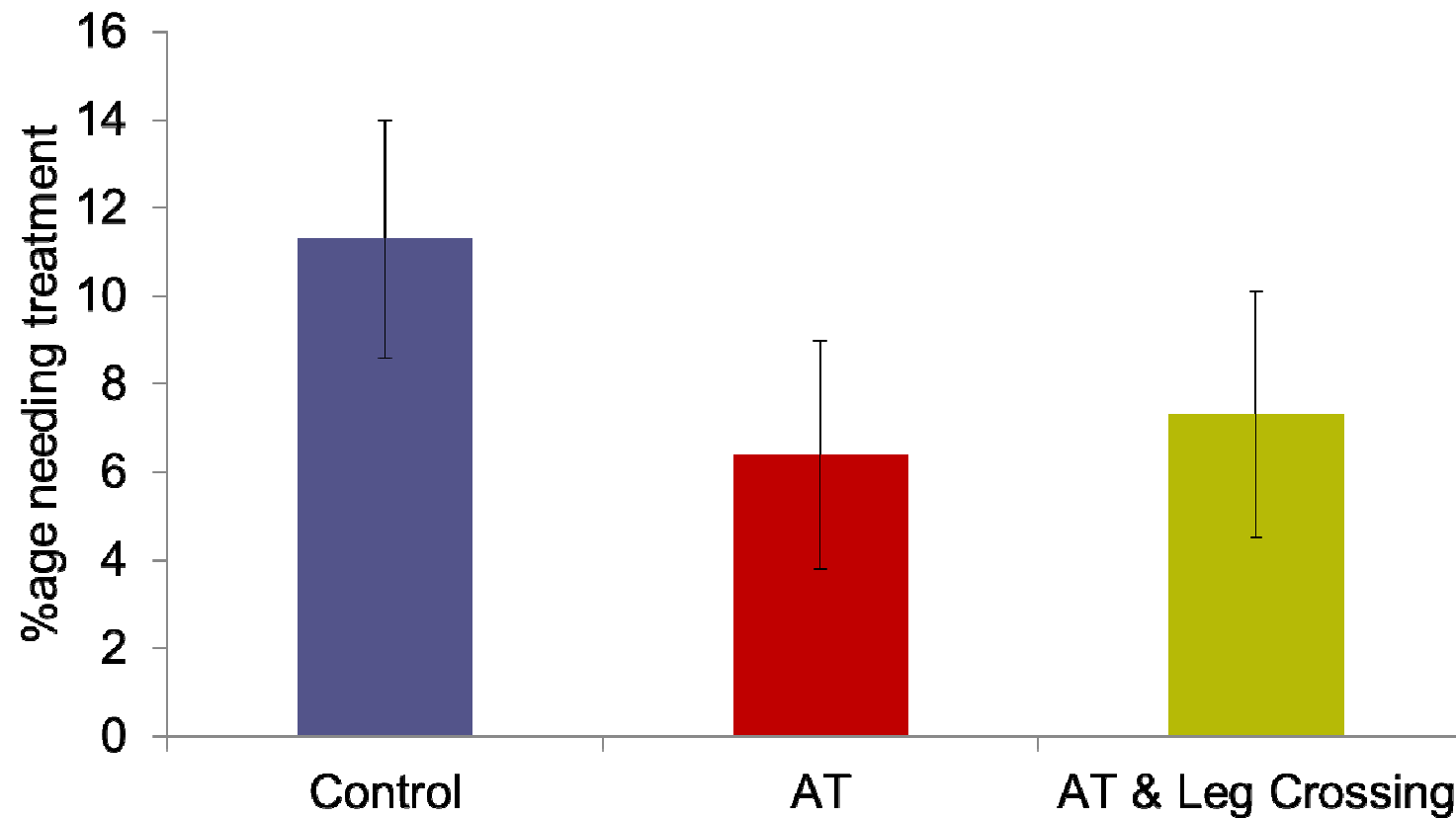
# Statistical analyses

- Part 1
- Series of GLM on Treatment (Chair recline/cold compress) and Symptoms (BDRI)
  - Continuous variable analyses
    - 2 Sex (M/F)
    - 3 Condition (Control/Applied Tensions/AT & Leg Crossing)
    - Predonation anxiety levels



# GLM

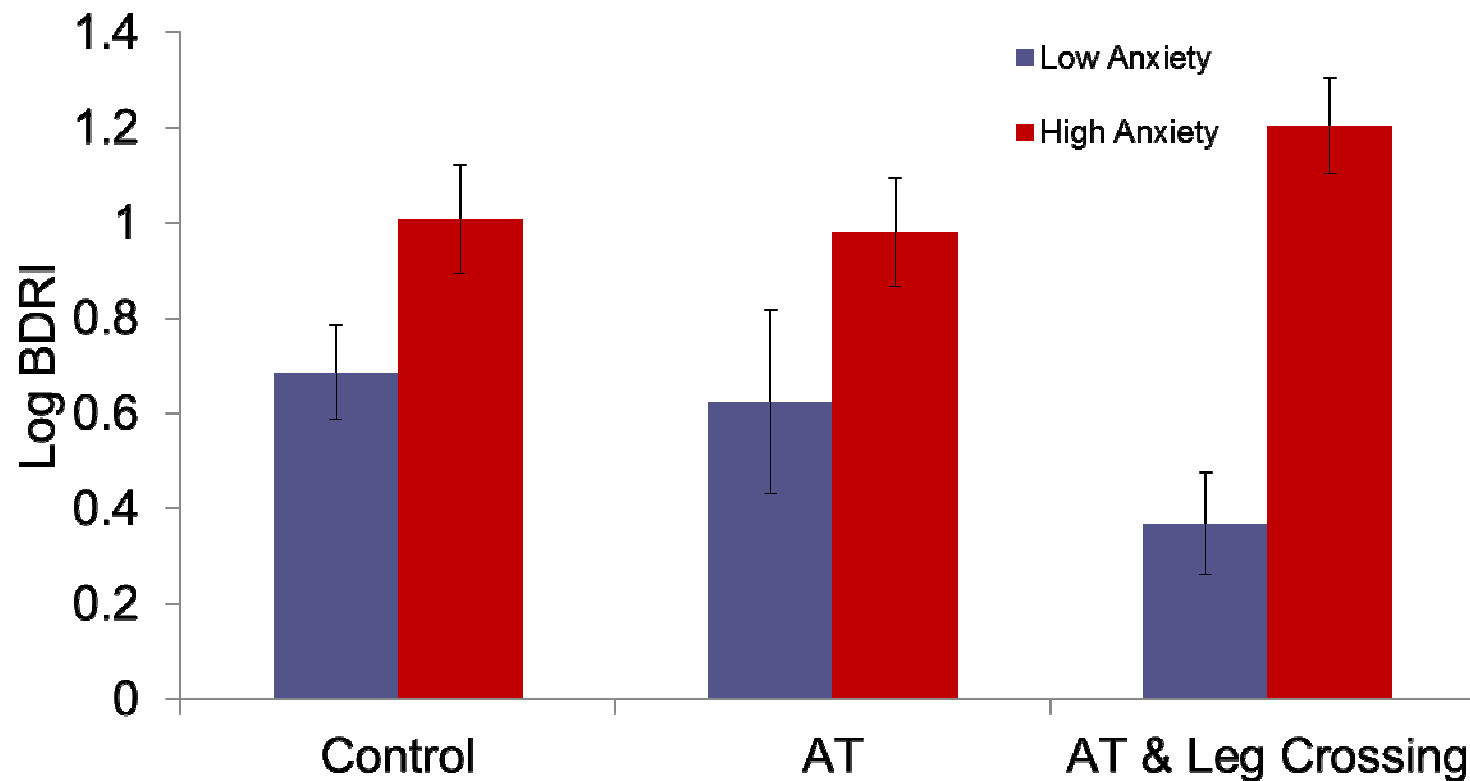
## Effects of AT on Treatment



Main Effect of Condition  
 $F(2, 387)=0.795, p= 0.005$

# GLM

## Effects of AT on symptoms (log BDRI)



Anxiety x Condition Interaction  
 $F(2, 385)=3.75, p= 0.024$

# Statistical analyses

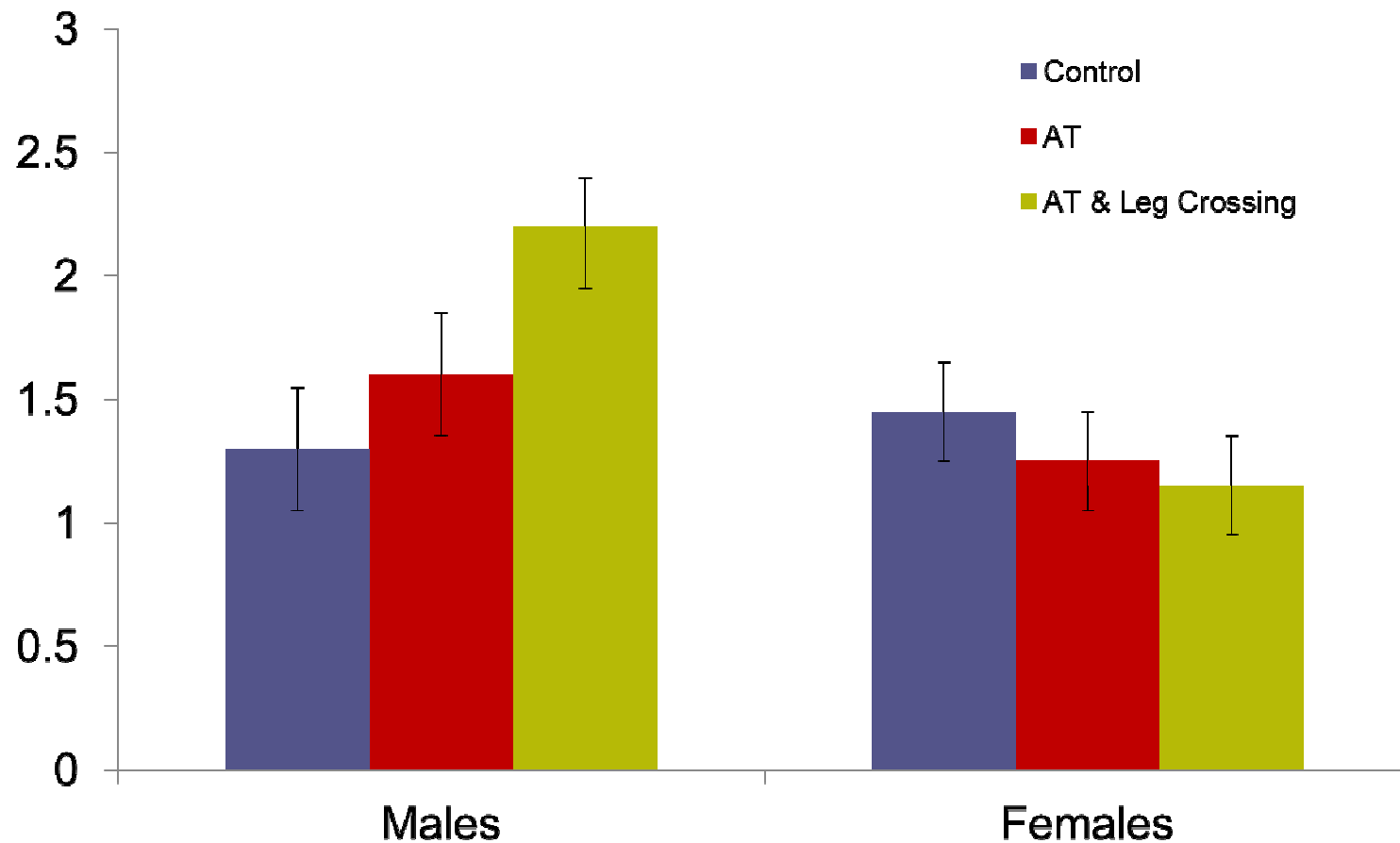
- Part 2
- GLMs on Likelihood of Subsequent Donations, Return to Donate, and Number of Subsequent Returns after 2 years
  - Continuous variable analyses
    - 2 Sex (M/F)
    - 3 Condition (Control/Applied Tension/Crossing)
    - Predonation anxiety Levels

# Results GLM Donor Returns

- No significant effects in the analyses of ratings of likelihood to donate again
- No significant effects in the analyses of whether or not they returned to give again in the subsequent two years but a trend was found towards those who practiced AT or AT & Leg Crossing
- Total number of subsequent donations was the important factor

# GLM

## AT on Number of Subsequent Returns



Interaction of Sex by Condition  
 $F(2, 388)=3.10, p= 0.046$

# Conclusions

- Consistent with prior research, AT has a favorable impact on vasovagal symptoms
- Interestingly, one form of AT did not appear to be clearly superior than the other in terms of symptom reduction
- However, leg crossing does appear to be beneficial to donor return
  - Men who practice leg crossing with AT have increased subsequent donations
  - If they reported practicing their technique the entire time in the donation chair (adherence) these findings were increased
- Impact of AT on donor return is not simply placebo-practice is necessary

# Limitations & Future Research

- Adherence levels were satisfactory but could be improved
  - 73% and 69% (AT, AT & Leg Crossing) said they practiced technique the entire time
- Objective measures such as an accelerometer would improve the validity of the study
- Sex based differences in applied tension
  - Why do males respond to AT differently than females?

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