



**CALIFORNIA STATE SCIENCE FAIR  
2017 PROJECT SUMMARY**

<b>Name(s)</b> Evelyn Tran	<b>Project Number</b> <b>J1314</b>
<b>Project Title</b> <b>Push-Pull Dynamics: The Effect of Pushing Muscles to Failure on Successive Exercises</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> Will performing one set of pushups to failure prior to performing one set of pull ups to failure effect the number of repetitions completed in the one set of pull ups to failure?</p> <p><b>Methods/Materials</b> Control group routine (one set of pull ups to failure), experimental group #1 routine (one set of pushups to failure followed by 30 seconds of rest before one set of pull ups to failure), and experimental group #3 routine (no rest between sets) repeated three times during the course of nine days - every routine performed with 24 hour difference. No physical interactions to cause a warm up, no ingestion or anything to enhance performance. Subjects may hydrate (100% mountain spring water: zero calories, no sweeteners, no artificial colors or flavors). Maintain facial expression, mood, and tone of voice, and routines over the course of nine days.</p> <p><b>Results</b> Results show performing one set of pushups prior to one set of pull ups to failure with a thirty second rest period in between increases the number of pull ups. In perspective, the number of pull up repetitions completed in the control group is invariably equal or greater than the number of pull up repetitions completed in the corresponding trial in the experimental group. Individual trials in the control group consistently increase from previous results.</p> <p><b>Conclusions/Discussion</b> I predicted one set of pushups before one set of pull ups to failure can increase the pullup repetitions. I hypothesize thirty seconds of rest between will give time for blood flow to increase to primary muscles targeted in both the pushups and pullups (the abdominal muscles used to stabilize in both exercises). A graph shows performing pushups prior to pull ups with a thirty second rest period between has the most significant effect in increasing pull up repetitions. The answer to my question then, is performing one set of pull ups to failure prior to performing one set of pull ups to failure does increase the number of pull up repetitions. Experimental group 1 was the most successful experimental group, showing significant increases in pull up repetitions completed, implying that the cardiac system impacted and played a significant role in this experiment due to the failed performance in the experimental group 2.</p>	
<b>Summary Statement</b> Will performing one set of pushups to failure prior to performing one set of pull ups to failure effect the number of repetitions completed in the one set of pull ups to failure?	
<b>Help Received</b> While I received guidance on design from my parents and teacher, I researched and conducted the experiment myself.	