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### High Speed Cycling and the Law of Initial Values in Parkinson's Disease

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Wilder (1958) described the law of initial values (LIV) as a phenomenon of increased excitation due to stimuli when initial values are low, and *vice versa*. Our research program is focused on exercise interventions for people with Parkinson's disease (PD) and the size of the training effect appears to vary based on the subject's baseline fitness. **PURPOSE:** To determine the extent to which the LIV is expressed in functional data obtained from people with PD who were part of an interval-based exercise intervention. It was hypothesized that subjects with poorer initial values would show the greatest increase in fitness. **METHODS:** 31 people with PD exercised on stationary recumbent bicycles twice per week in a six-week program. High speed and low pedaling resistance emphasized neural activation while reducing musculoskeletal and cardiovascular strain. 30-min. sessions included five min. of warm-up and cool-down at preferred pedaling cadence. In the middle 20 min., subjects executed 20, 15-s fast intervals. Maximum revolutions per minute (RPM-max) were obtained for the first and last training sessions. Timed up and go test (TUG), Activities-specific Balance Confidence Scale (ABC), 36-item Short Form Survey (SF36), and dominant hand isometric grip strength (DGrip) were administered pre-and post-training. ANCOVA and Pearson correlation coefficients describe relationships between pre-training scores and change scores on these five measures. **RESULTS:** There were moderate-strong negative correlations between pre-training scores and change scores (TUG  $r = -.385$ ,  $p = .035$ ,  $n = 30$ ; ABC  $r = -.492$ ,  $p = .006$ ,  $n = 28$ ; SF36  $r = -.294$ ,  $p = .121$ ,  $n = 28$ ; DGrip  $r = -.386$ ,  $p = .029$ ,  $n = 31$ ; RPM-max  $r = -.462$ ,  $p = .020$ ,  $n = 25$ ). When corrected mathematically for initial values (ANCOVA, Microsoft Excel), the correlations all become zero, indicating that the size of the effect was indeed related to baseline fitness. **CONCLUSION:** As hypothesized, the LIV is expressed in this population such that baseline status predicts a meaningful amount of variance in training effects. The indication that a low-fit person has a greater capacity for physical improvement compared with a high-fit person supports our idea that this intervention is meant for the onset of an exercise regimen that will eventually follow the principles of progression, overload, and specificity.

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