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Information Processing is not Affected by Multiple Concussions in College Age Students

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A concussion may result in several long-term effects including mild cognitive impairment, mental and physical ailments, cognitive decline, and/or increase risk of depression/anxiety. Information processing is an important aspect of executive function, cognition, and movement adaptation. The components of information processing can be assessed using multiple types of reaction time (RT). Considering the lack of differences found in multiple concussed 17-22 yr old athletes compared to non-concussed athletes on ImPACT testing, more specific information processing testing is needed. **PURPOSE**: To determine the effects of multiple concussions on information processing. **METHODS**: 41 subjects (23 female;18 male; 20.5±1.6 yrs), took part in this study. 16 participants had no diagnosed concussions (NONE), 12 had 1-2 diagnosed concussions (FEW), and 13 had 3 or more (MANY, mean: 4, range 2-8) diagnosed concussions. Simple reaction time (SRT, stimulus detection), disjunctive reaction time (DRT, stimulus identification), and choice reaction time (CRT, response selection) tests were utilized to assess information processing. Reaction time tests were compiled and downloaded from Psychtoolkit.com to run offline. Average times for each test along with error scores for DRT and CRT for each participant were recorded for later analysis. A 3x3 between-within factorial ANOVA was used to determine interaction between groups and RTs. One-way ANOVA were used to determine the effects of RT on each group separately. **RESULTS**: Mean reaction times (milliseconds, ms) (sd) for each group are as follows: **NONE**; SRT: 322.1ms (± 22.2), DRT: 425.5ms (±83.2),CRT:456.1ms (±38.3); **FEW**; SRT: 328.1ms (±35.3), DRT: 432.5ms (±65.5), CRT:470.1ms (±75.1) ; **MANY**: SRT: 335.0ms (±41.4), DRT: 448.4ms (±77.8), CRT: 498.3ms (±80.7). Factorial ANOVA revealed no significant interaction between the number of diagnosed concussions and reaction times [$F(4, 760) = 0.294$, $p=0.881$]. All three groups had significant RT differences (all $F>75.0$, all $p<0.001$). Post hoc analysis shows SRT significantly quicker than both DRT and CRT for all groups (all $p\leq0.001$). **CONCLUSION**: Information processing is not affected by one or multiple concussions when looking at college aged students.