

Changing Criterion Review Article

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The Range-Bound Changing Criterion Design

Dennis McDougall (2005)

Purpose, Subject(s), Setting(s)

The purpose of this study was to apply range-bound changing criterion to exercise performance. The subject was a middle-aged overweight man who wanted to increase his daily exercise regimen, reduce weight, and improve his cardiovascular health and fitness levels. Research was collected over 213 days. A data point was added for number of minutes ran by the participant over seven phases of intervention.

Method

The range-bound changing criterion (RBCC) can best be explained by McDougall (2005):

The range-bound changing criterion design is a simple variation of the classic changing criterion design. The two designs are identical except for one important design feature. Unlike the classic design, in which investigators establish a single criterion within a specific intervention phase, the range-bound version establishes both a lower and upper criterion within a specific intervention phase. The two criteria create a bounded range of performance—one specifies the minimum level,

or floor, and the other specifies the maximum level, or ceiling, of performance for the target behavior.

The dependent variable for this study was number of minutes exercised by the participant (i.e., running). The independent variables used during treatment were “used goal setting and multiple behavioral self-management (BSM) components to increase duration of daily exercise” (McDougall, 2005).

A schedule of phases with performance goals was established prior to intervention and labeled as Table 1 within the article. The “first intervention phase, the participant aimed to run, on average, 20 min per day, for six of seven days of the week. Moreover, the participant established, around this mean, a [plus or minus] 10% range to ascertain the minimum and maximum number of minutes he should run each day” (McDougall, 2005). For example, during the first intervention, the participant attempted 20 minutes per day, a range between 18 and 22 minutes was considered an accomplished goal for that daily run.

The RBCC spanned over 213 days. The baseline was established after 133 days. The participant increased the minutes of running for each of the subsequent six phases (i.e., 40, 60, 80, 60, 80, 100). Data was collected by self-reporting minutes ran per day and graphed on a line graph, Figure 1 (McDougall, 2005). During each phase a maximum and minimum number of minutes of running was established of the same formula (plus/minus 10%) throughout all subphases.

Results and Discussion

Results were recorded daily (six days on, one day off) in minutes ran. Goals were achieved daily for the seven interventions. Percent was calculated using a percentage of

data point (PCD) formula. “PCD is equal to the number of data points within intervention phases that ‘conform’ (i.e. reside within *a priori* criterion ranges for respective intervention phases), divided by the total number of data points within all range-bound intervention phases, multiplied by 100%” (McDougall, 2005). All seven subphases resulted in 100% of trials being reached. The author says the model “demonstrated very high experimental control over the target behavior” (McDougall, 2005). It is worth noting, the author is also the participant for this study and data points were self-reported. He goes on to explain the PCD, experimental control, and intervention efficacy will be weakened if the data points do not conform inside the ranges of prescribed performance. Based on the participant/author’s criteria, the data points within the article show a 100% PCD and show a high functional relationship between the independent variable and target behavior.

According to the researcher, this was the first application of the RBCC in sports research and is significant and can be used in many disciplines other than sports related endeavors (i.e., musician training, physical therapy, addictions, etc.). The author explains the importance of having a range for these activities must be decided *a priori*. The reason for having this range is to help build endurance and not overly fatigue the training process, which may lead to injury or a decline in the activity. In addition, the article discusses the various applicable treatments and scenarios for including this type of changing criterion design. No limitations were discussed, but discussion of how to achieve criterion increments was elaborated. The author asserts this method will provide more experimental control if used with the appropriate application.

Bibliography

McDougall, Dennis. (2005). The range - bound changing criterion design. Behavioral Interventions. 20. 129 - 137. 10.1002/bin.189.