Figure 1: Illustrating the Up-Down adaptation rules for converging on level yielding $P = 0.5$ positive responses. The current level is $L_1$ with $P = P_1$. If a positive response is observed, the level is changed to $L_0 < L_1$. A negative response causes the level to be changed to $L_2 > L_1$. 
1. Select an initial value of $L = L_0$.
2. Estimate the value of $Q = Q_i$ corresponding to the value of $L = L_i$.
3. If $Q_i$ is close enough to $Q^*$, estimate $L^*$.
   - $L^* = f(L_F, L_{F-1}, \ldots)$
4. Otherwise, iterate starting at step 2 with
   (a) $L_{i+1} > L_i$ if $Q_i < Q^*$, or
   (b) $L_{i+1} < L_i$ if $Q_i > Q^*$. 
1. What is the performance target level?
2. When should the testing level change?
3. What should the new test level be?
4. When does an experimental run end?
5. How to estimate the desired test level?
What is the performance target level?
1. 50% vs 29% and 71%
2. 71% vs 84-94%
When should the testing level change?

1. After each trial.

2. When results match a pattern.

3. When performance deviates from the target by a specified amount.
What should the new test level be?

\[ L_{i+1} = L_i \pm S_i \]

1. Fixed Step Size:

\[ S_i = S_0 \]

2. Step Size determined by target probability:

\[
\frac{S_{inc}}{S_{dec}} \propto \frac{p}{1 - p}
\]

3. Step Size decreases throughout run.

4. Step Size determined by preceding trials.
   (a) Immediately preceding history.
   (b) Entire history of run.
When does an experimental run end?

1. Properly
   (a) Fixed number of trials.
   (b) Fixed number of reversals.
   (c) Minimum confidence interval.

2. Improperly
   (a) Too many trials.
   (b) Too great a stimulus (difference).
   (c) Too small a stimulus (difference).
How to estimate the desired test level?

1. Average all trials.
2. Average a fixed sample of trials.
3. Average all reversals.
4. Average an even number of reversals.
5. Average an even number of reversals, excluding the first $N$.
6. Final testing level.
Figure 2: Test level on successive trials during an updown procedure.
Figure 3: Illustrating the Up-Down adaptation rules for converging on level yielding $P = 0.707$ correct responses.
Figure 4: Illustrating a Pest run with a target of $P = 0.75$ correct responses and a Wald tolerance $w = 2$. 

C - correct responses

T - trials
1. On every reversal of step direction, halve the step size.

2. The second step in a given direction, if called for, is the same size as the first.

3. The fourth and subsequent steps in a given direction are each double their predecessor (except that, as noted above, large steps may be disturbing to a human observer and an upper limit on permissible step size may be needed).

4. Whether a third successive step in a given direction is the same as or double the second depends on the sequence of steps leading to the most recent reversal.

   (a) If the step immediately preceding that reversal resulted from a doubling, then the third step is not doubled.

   (b) If the step leading to the most recent reversal was not the result of a doubling, then this third step is double the second.

5. Testing continues until the step size is made smaller than a specified value. The final test level is the estimate of $L^*$. 