

## Steps for constructing a Normal Probability Plot

- **Step 1:** Order the effects from smallest to largest.
- **Step 2:** Number the ordered values  $i=1,2,\dots,n$  where the smallest value is numbered 1 and the largest is numbered  $n$ .
- **Step 3:** Compute  $\frac{(i-.5)}{n}$  for  $i=1,2,\dots,n$ .
- **Step 4:** Use the table of the normal distribution to obtain a z-value from the standard normal distribution corresponding to the cumulative probability given in **Step 3**.
- **Step 5:** Plot the pairs, (ordered value, z-value), with the measurement scale along the horizontal axis and the z-scale along the vertical axis.
- **Step 6:** Interpret the plot.
  - Plotted points falling along an imaginary straight line through (0,0) indicate estimated effects that can be attributed to normal random variability. The reciprocal of the slope of such a straight line gives an indication of the standard error of an estimated effect.
  - Plotted points falling far away from the imaginary line, upper right and lower left corners of the plot, indicate estimated effects that may statistically significant.
- **Example:**

effect	estimate	i	$\frac{(i-.5)}{15}$	z-value
A	-8.00	1	0.0333	-1.83
D	-5.50	2	0.1000	-1.28
C	-2.25	3	0.1667	-0.97
BC	-1.25	4	0.2333	-0.73
ABC	-0.75	5	0.3000	-0.52
BCD	-0.75	6	0.3667	-0.34
CD	-0.25	7	0.4333	-0.17
ACD	-0.25	8	0.5000	0.00
ABCD	-0.25	9	0.5667	0.17
AD	0.00	10	0.6333	0.34
ABD	0.50	11	0.7000	0.52
AC	0.75	12	0.7667	0.73
AB	1.00	13	0.8333	0.97
BD	4.50	14	0.9000	1.28
B	24.00	15	0.9667	1.83