

# Determining Your Own Norms for Assessment

Shelia L. Jackson, Ph.D. Professor of Health and Physical Education  
Arkansas Tech University

# What is a Norm-Referenced Test?

- Standardized test, random sample, representative of the population
- 200
- Scores compared to the norm data
- Percentiles, T scores, and Z scores

# What's the purpose of a Norm-Referenced Test?

- Provides quantitative evidence
- Allows teacher to compare her/his students to other students
- Helps teacher to assess his/her program
- Allows teacher to relate to parents how their child compares to the average child

# Examples of Norm Referenced Psychomotor Tests

- Bayley Scale of Infant Development
- Bruninks Oseretsky Test of Motor Proficiency<sup>2</sup>
- Test of Gross Motor Development<sup>2</sup>
- McCarron Assessment of Neuromuscular Development
- Fitnessgram

# Why Develop Your Own Norms?

Administrative Feasibility:

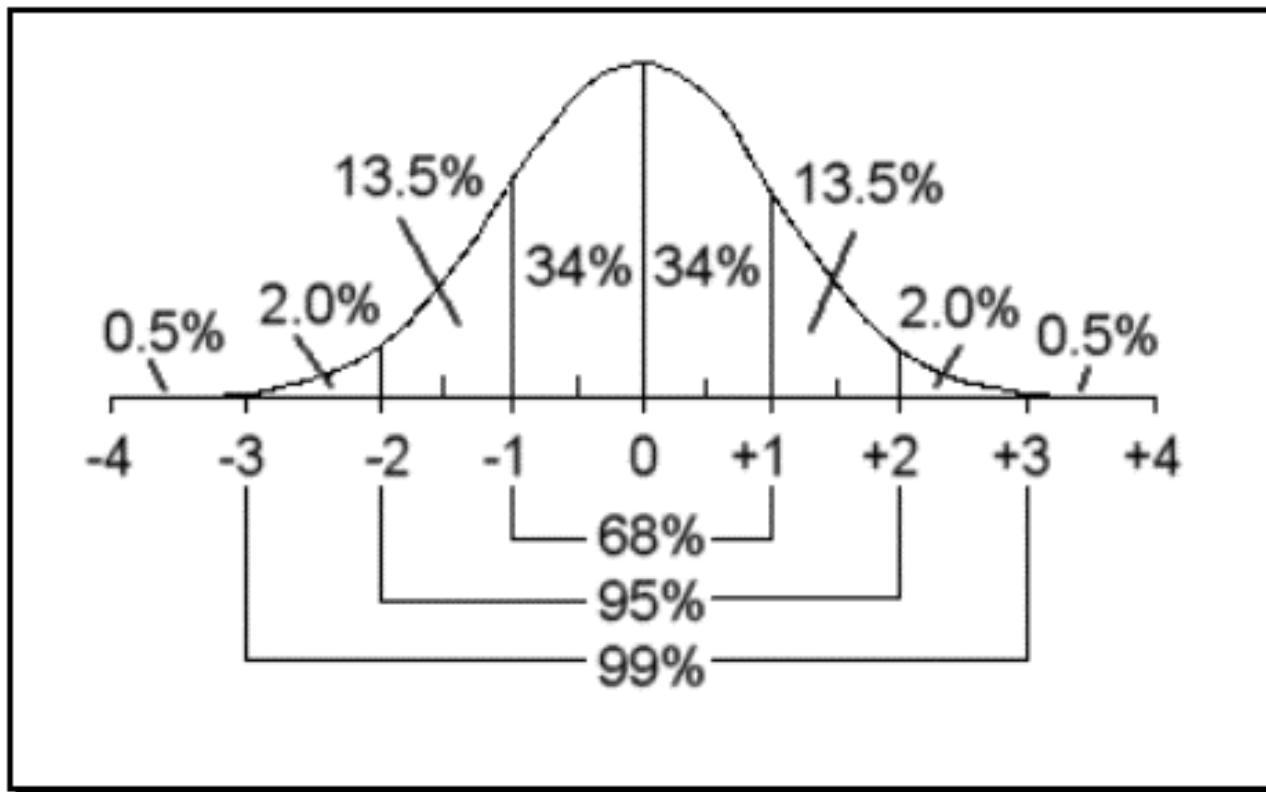
Time, Cost, Training, Equipment, Personnel, Age  
Appropriateness, Scoring

Allows you to measure what you already do:

Jump, Kick, Throw, Catch, Dribble, Run, Strike, Field,  
Pass, Set, Shoot, Cast, Roll, Toss, Head, Climb, Crunch,  
Pull, Push, Put, Drive, Balance, Reach, Grip, Lift, Step,  
Slide, etc.

If you can count it, time it, weigh it, or give it a distance,  
you can norm it.

# Normal Curve & Standard Deviation



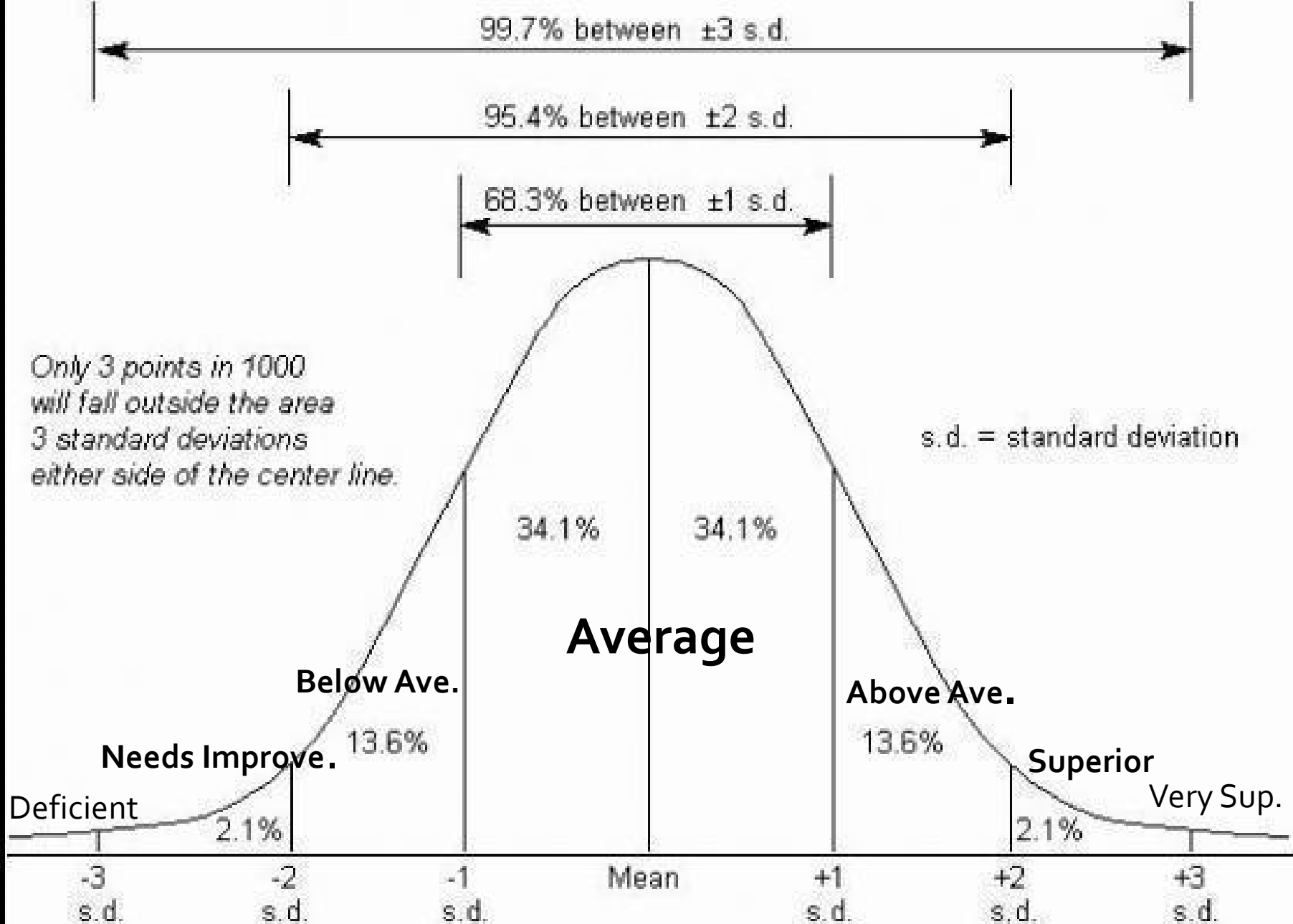
# How to Make Your Own Norms

- Step One –
  - Determine evaluation scale based on normal curve
- Step Two-
  - Put data on spread sheet
- Step Three –
  - Continue adding data until 200 scores
- Step Four –
  - Calculate mean and standard deviation
- Step Five –
  - Determine raw scores for each standard deviation
- Step Six-
  - Compare students' performances to norm

# Step One: Determine Scale

- Determine your evaluation scale based on the normal curve.
- For instance, I could set my parameters like this:
  - Very Superior = +3 standard deviations
  - Superior = +2 standard deviations
  - Above Average = +1 standard deviation
  - Average = + and - 1 standard deviation
  - Below Average = -1 standard deviation
  - Needs Improvement = -2 standard deviations
  - Deficient = -3 standard deviations
- **Note: If lower scores are better scores (i.e., golf), then you should subtract the standard deviation as you go up the scale.**





# Step Two: Record data collected on Excel or equivalent data sheet

Name	Sit and Reach Raw Score
Frodo	10
Sam	10.5
Pippen	13
Marion	12.5
Gandalf	10.5
Aragorn	14.5
Legalos	14.5
Gemilee	5.5
Arwen	15
Galadrial	14

# Step Three: Add data to previous collected scores until 200

Name	Sit and Reach Raw Score
Frodo	10
Sam	10.5
Pippen	13
Marion	12.5
Gandalf	10.5
Aragorn	14.5
Legalos	14.5
Gemilee	5.5
Arwen	15
Galadrial	14

## Step Three: Calculate mean using formulas drop down menu on norm data sheet.

1. Go to the top and click on formulas. Note: Go to the Excel spreadsheet labeled, "Data Set for Psychomotor Tests."
2. Click on insert functions on the left side.
3. If you do not see Average in the function list, type "average" in the "Search for function box."
4. Click in a box that's open under your data column and then click on the "Average" function.

## Step Three: Calculate mean and standard deviation cont.

- Make sure the letter matches the column of your data (i.e., B) and the number matches the row where your data begins (i.e., 2) then type a colon, followed by the same letter as previously (you haven't changed columns), followed by the row that matches where your data ends (i.e., 179).
- So, in this case, the box should read, B2:B185
- Click and you now have the average of the scores from 2 to 179 in column B.

# Step Three: Calculate standard deviation

- Repeat the same process beginning with clicking on an open box under the average except for the standard deviation (STDEV).

# So using the mean (12.36 inches) and standard deviation (2.66 inches) calculated on the sit and reach, my evaluation chart might look like this:

Very Superior =  $\geq 20.5$  inches ( $>99.9\%$ ) ( $17.68 + 2.66 = 20.34$ )

Superior = 18 – 20 inches ( $>97.7\%$ ) ( $15.02 + 2.66 = 17.68$ )

Above Average = 15.5 – 17.5 inches ( $>84.1\%$ ) ( $12.36 + 2.66 = 15.02$ )

Average = 10 – 15 inches ( $>15.9\%$ ) ( $12.36 - 2.66 = 9.7$ )

Below Average = 7.5 – 9.5 inches ( $>2.3\%$ ) ( $9.7 - 2.66 = 7.04$ )

Needs Improvement = 4.5 – 7 inches ( $>.1\%$ ) ( $7.04 - 2.66 = 4.38$ )

Deficient = Below 4 inches ( $< .1\%$ )

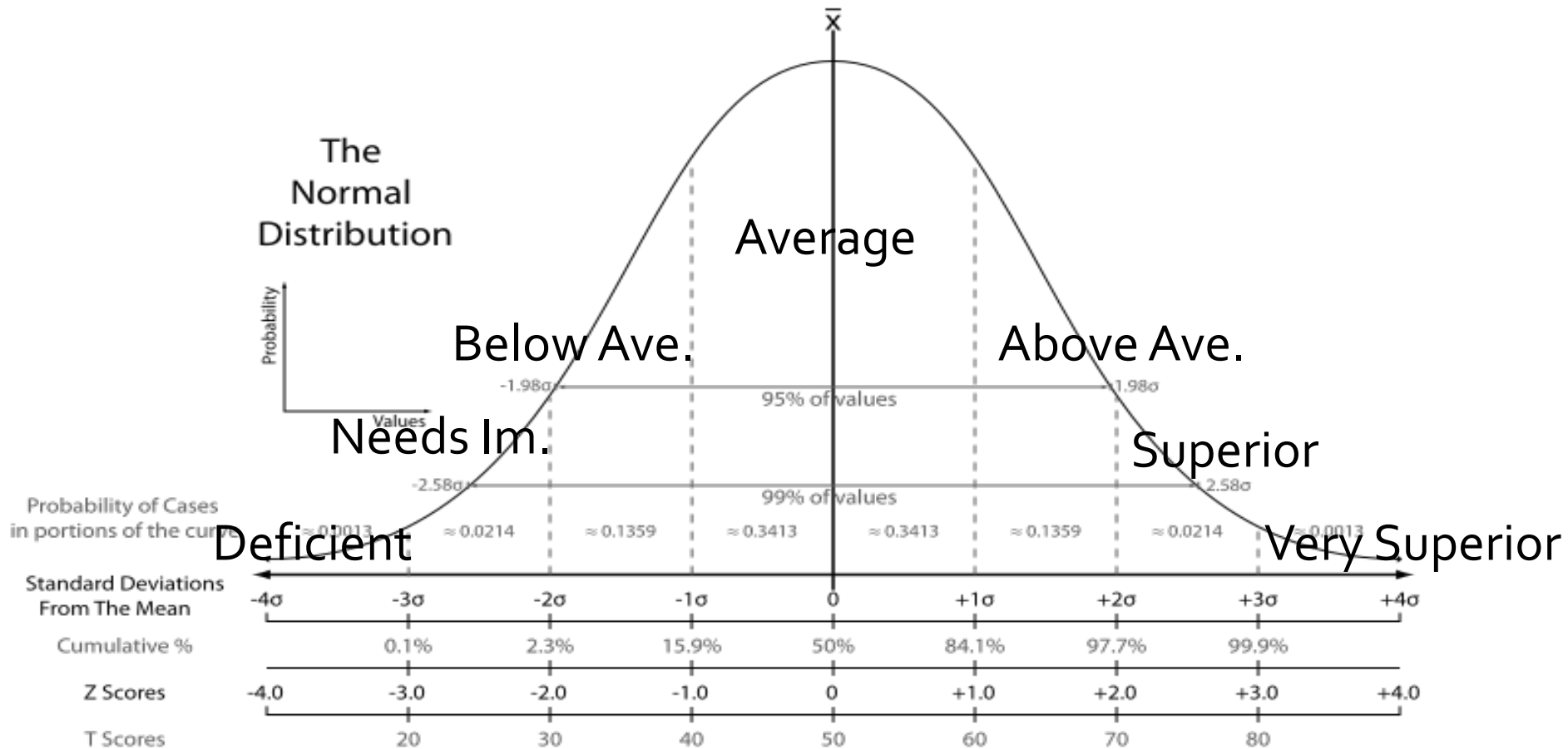
- Note that I rounded my scores in the chart to match the type of scores collected in the original data. Since the sit and reach was collected to the nearest half inch, my evaluation chart should also be to the half inch.

# Example of A-F Grading Scale

- A = > 15.5 inches      >84%      +1 sd
- B = 12.5 – 14.5 inches      >50%      >mean
- C = 10 – 12 inches      >16%      -1 sd
- D = 7.5 – 9.5 inches      >2%      -2 sd
- F = < 7 inches      <2%      <-2sd



# I always like to have a bell curve around when explaining Norm Referenced Tests



# Step Six: Fill in the Evaluation Column

Name	Sit and Reach Raw Score	Evaluation
Frodo	10	Average
Sam	10.5	Average
Pippen	13	Average
Marion	12.5	Average
Gandalf	10.5	Average
Aragorn	14.5	Average
Legalos	14.5	Average
Gemilee	5.5	Below Average
Arwen	15	Average
Galadrial	14	Average

# Website I Used to Form My Evaluations

- <http://www.medfriendly.com/standardscoretopercentileconversion.html>

# Final Thoughts

- Means and Standard Deviations and therefore standard scores are not appropriate to use with nominal or ordinal data.
- If multiple schools would like to get together to have a larger norm sample, you only have to agree on what tests and standardize how they're administered.
- If you would like to be a part of establishing state norms, stay for the next session.

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- Thank you!