Award Winning Data

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Teacher Notes and Answers

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TI-Nspire™   Investigation   Student   50 min

Introduction

Arguably the world's most famous award ceremony are the Academy Awards®. Commencing in May 1928, Pricewaterhouse has managed the awards since 1935 and initiated the secrecy of the result by placing the winners name in a sealed envelope coining the phrase: "The envelope please". Are complaints about the awards simply a case of 'sour grapes' or is there evidence to suggest a level of bias. Are the awards ageist or sexist?

Past award winners include Jodie Foster (29), Gwyneth Paltrow (26), Julia Roberts (33), Dustin Hoffman (51), Jack Nicholson (60) and Denzil Washington (47). Author Sarah Sands wrote an article about Demi Moore's objection to Hollywood's bias towards younger actresses. Demi claimed that there are fewer roles for chronologically mature females than for males. Is there statistical evidence to support Demi's case?

Everyone has seen images of botched cosmetic surgery. If Demi is correct in her claim it may help explain the obsession with cosmetic surgery amongst the acting fraternity, particularly female stars. Images of people portrayed in the media influence our perception of what is normal. If Hollywood and other media continually portray unrealistic, enhanced images this can alter our perception of reality. The aim of this investigation is to determine if data relating to the winners supports the ageist and sexist claim.

Introduction – Setting up the calculations

Press the **Home** key, select **My Documents** and navigate to the Academy Awards activity and open the document.

Scroll through the list of award winners on page 1.2.[1]

Navigate to page 1.3 and answer the question.
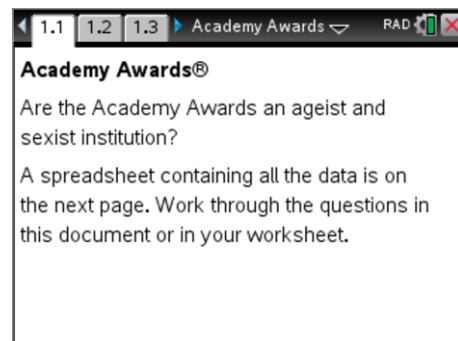
To calculate the mean for the age of actors and actresses, insert a 'maths box' by pressing **Ctrl + M** in the **Answer** space.
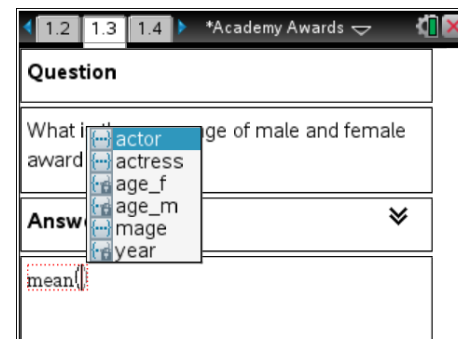
Type the word:

mean(

Use the **VAR** button and then enter the appropriate variable and close the parenthesis.

Variables:

age_f = Age of female winners

age_m = Age of male winners

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[1] List of winners source: http://en.wikipedia.org/wiki/Academy_Award

Author: P. Fox

Building Evidence

1. What is the mean age of male and female award winners?

    a. Actor?   43.6 years

    b. Actress?   35.8 years

Teacher Notes:

The purpose of this question is to highlight that sometimes a single statistic does not tell the whole story. While the age difference is relatively large, it is the boxplot that really highlights the difference in the gender.

Calculator Tip!

Time Saving Tip:

Use the VAR key to access variables.

Calculation Tip:

TI-nspire has many data related commands including, min(), max() and mean(). These commands will be useful when answering the following questions.

2. Who is the oldest recipient of an Academy award for best actor or actress? (Include the age)

The oldest recipient is 81 years old. (Jessica Tandy) The oldest male is 76 years old. (Henry Fonda)

3. Determine the range of ages for Academy Award winners.

    a. Actor   76 – 29 = 47

    b. Actress   81 – 21 = 60

Teacher Notes:

The range is not revealing much here with regards to the age bias, indeed seems to be working against the argument protested by Demi Moore. The data here is typical of outliers and how they may be used in some (weak) arguments as supporting evidence: "I don't believe an ageist or sexist bias exists, Jessica Tandy won an academy award at age 80, Katherine Hepburn won her award at age 76." Quoting isolated cases does little to support genuine statistical evidence; indeed there are three more outliers for females: (ages) 60, 61 and 62.

4. Determine the median age for both male and female Academy Award winners.

Median Age (Males) = 42

Median Age (Females) = 33

Teacher Notes:

These statistics are starting to tell a different story as the median statistic helps remove outliers from the data. The age difference of 9 years is not representative of average population ages where there is virtually no difference. Students however may not find the difference significant enough; there is no representation for the distribution or spread of the data.

Author: P. Fox

Graphing the Data
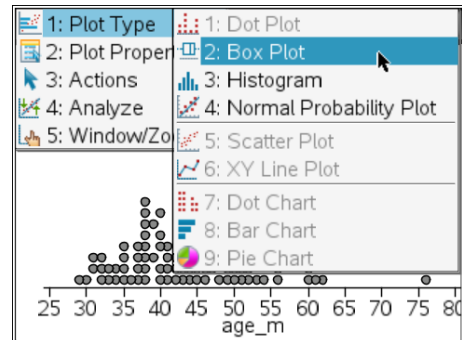
Press the **Home** key, select **Data & Statistics**.

The entire data set will be scattered over the screen.

Use the **TAB** key to navigate to the x axis 'add variable' and select **age_m**.
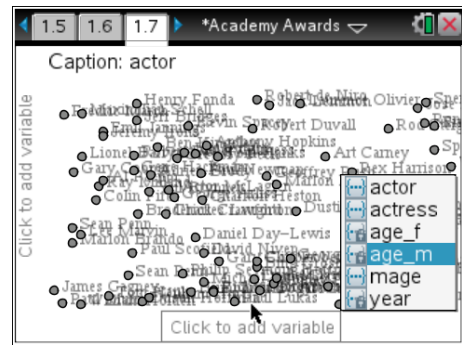
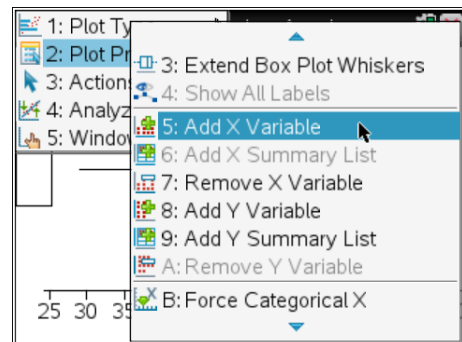The default graph type for data is a 'dot plot'.

To change to a box plot, select **Plot Type** from the menu followed by **Box Plot**.

To add the female data to the graph, select **Plot Properties** followed by **Add X Variable.**

Select : **age_f**

Note: Moving the mouse over the boxplot(s) displays the various statistics relating to the boxplot.

5.   Use your boxplots to answer the following questions:

   a.   Determine the age below which 75% of female award winners exist.

   Q_3 = 39 (Females)

   b.   Determine the age above which 75% of male award winners exist.

   Q_3 = 49 (Males)

Teacher Notes:

At last the boxplots provide a bigger story. Students should now begin to realise that by age 39 females are not as likely to win an award whereas for males their journey is just starting. (Q_1 = 38). This point is not laboured here rather 'hinted' so that students can do their interpretations in their News article response.

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TEXAS INSTRUMENTS
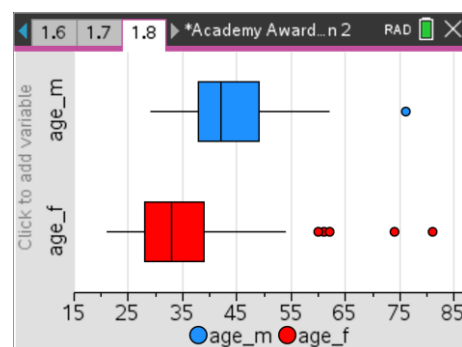
6. Construct a histogram and categorise ages into 20's, 30's, 40's... 80's and compare this representation of the data with the boxplot. Age categories can be established using 'bin settings'. The bin settings are located in the Plot Properties > Histogram > Settings > Equal Bin Width.

   a. What information does the histogram show better than the boxplot?

   The histogram shows a steady decline in ages for both males and females and that the decline starts in the 30's for women and 40's for men.

   Reducing the bin width further to 5 year increments highlights this difference even more. Females appear to reach a peak between the ages of 25 and 35 whereas for males it appears to be between 40 and 45.

   b. What information does the boxplot show better than the histogram?

   The boxplot is very dramatic in the way it shows the quartiles. Column height difference is not as dramatic as seeing the 'middle 50%' of each cohort located at almost completely different ages.
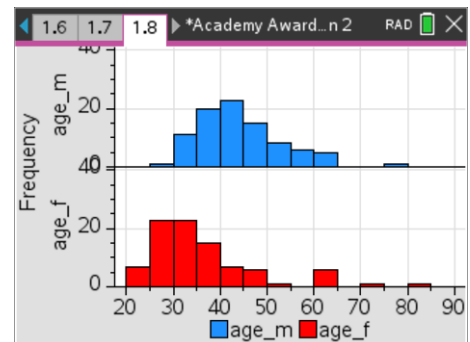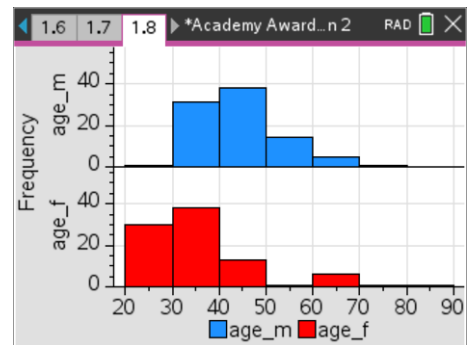
7. Write a newspaper style article either supporting or refuting the claim that "Aging female actors are denied roles of significance and worthy of an Academy Award". Include specific and appropriate statistical references in the article to support the claim.

   Answers will vary; students should certainly reference the significant statistic that 75% of female award winners are aged below 39 whilst almost the reverse is true for males. (75% of male recipients are over the age of 38.)

Further Investigation

Is there a change in attitude over recent years? Use a graph to investigate if a relationship exists between the year and age for both male and female award winners.

   a. Has there been a general increase or decrease in age for actors and actresses?

   The scatter plot for females (and males) both show a relatively small upward trend if a linear regression model is applied; however the r^2 value shows that this correlation is too weak to draw any conclusions. So the general answer would be no. There does however appear to be a greater diversity of ages; however this could be reflective of the greater diversity of ages within the general population.

   b. Is there a strong or weak correlation?

   The correlation is too weak to draw any conclusions.

   c. Group the data into decades, take the average for each decade and see if there is an overall trend from decade to decade.

   Grouping the data into decades reveals one stand out decade for females. In the 1980s the average winning age for females was 45.4. However by the 1990's the changed back to 35. There was no such stand out decade for males.

Author: P. Fox