

## Maths Project '03

### Task

The Question that I will be looking at is: “Does Peoples Estimation Of Time Improve With Age?”

### Variables

- Age

### Statement Of Task

As the task above states, I will be looking at how certain populations perceive time, in this case 30 seconds. For this project I will be looking at data from the age range 15 - 18. It would be appropriate for this mathematical project to get data from every person in every age range in the entire world but this is almost physically impossible and is certainly impractical for this project. Due to language barriers, the amount of time and money it would consume and also that some age ranges such as under the age of 7 would find it difficult.

The reason I have chosen the age range 15-18 is mainly due to practical purposes, the data is easily obtainable due to the fact that I am studying at a college with hundreds of people in that age range. Although it would have been possible to include data from younger students at college, I decided to use age 15 as my lowest parameter since a certain degree of maturity was required in order to collect the data in a reliable way. I chose to study 18 year olds because they will have had an extra 3 years of education and experience which should bring about a noticeable difference between the groups. The children I will be studying will all have had very similar experiences with their education i.e. within maths. I have also chosen to only study boys to minimise all factors other than age. I am also going to take some data from people over the age of 25 to see if there is a significant difference between the groups. This will be looked at to see the difference between adulthood and childhood. This data will be collected from people who work at the same place (laboratory at heartlands hospital) this will be done to minimize as many variables as possible. If I had more time I would collect data from a selection of different schools to see if education has any effect on time perception.

I will collect the data by asking individuals to estimate when they think 30 seconds has passed from when I say go. I will attempt to not let each student know what they will be doing as it will give them no time to practice and will also not announce what time as estimated in front of other students as it could give them an unfair advantage.



**Averages**

**Age: 15**

Mean –  $779 \div 10 = 25.96667$

Median – 26

Mode – 26

Range –  $38 - 20 = 18$

**Age: 18**

Mean –  $839 \div 30 = 27.96667$

Median – 27.5

Mode – 28

Range –  $35 - 24 = 11$

**Age: 25+**

Mean –  $436 \div 15 = 29.0667$

Median – 28.5

Mode - 28

Range – 11

**Age: 18 (Out Of College)**

Mean –  $306 \div 11 = 27.8182$

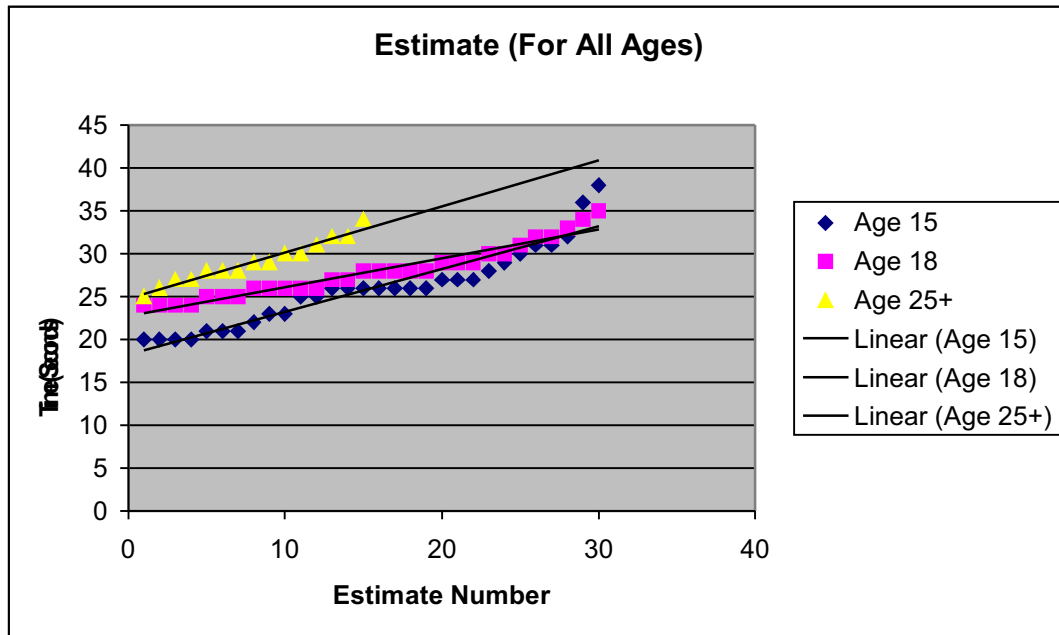
Median - 27

Mode – 24

Range – 9

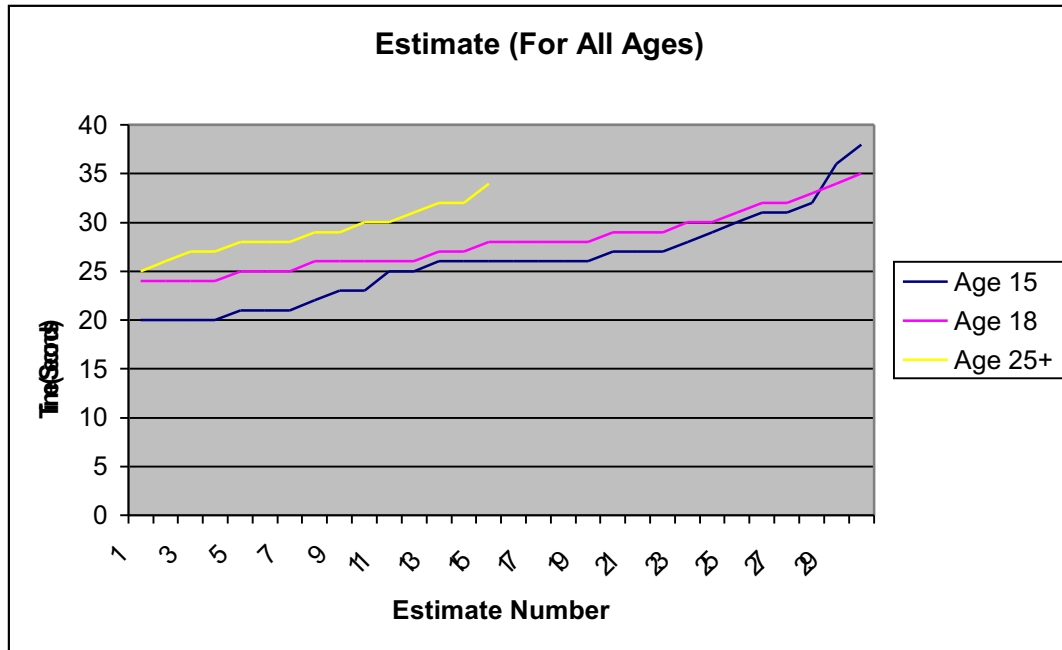
## Graphs

### Scatter Graph



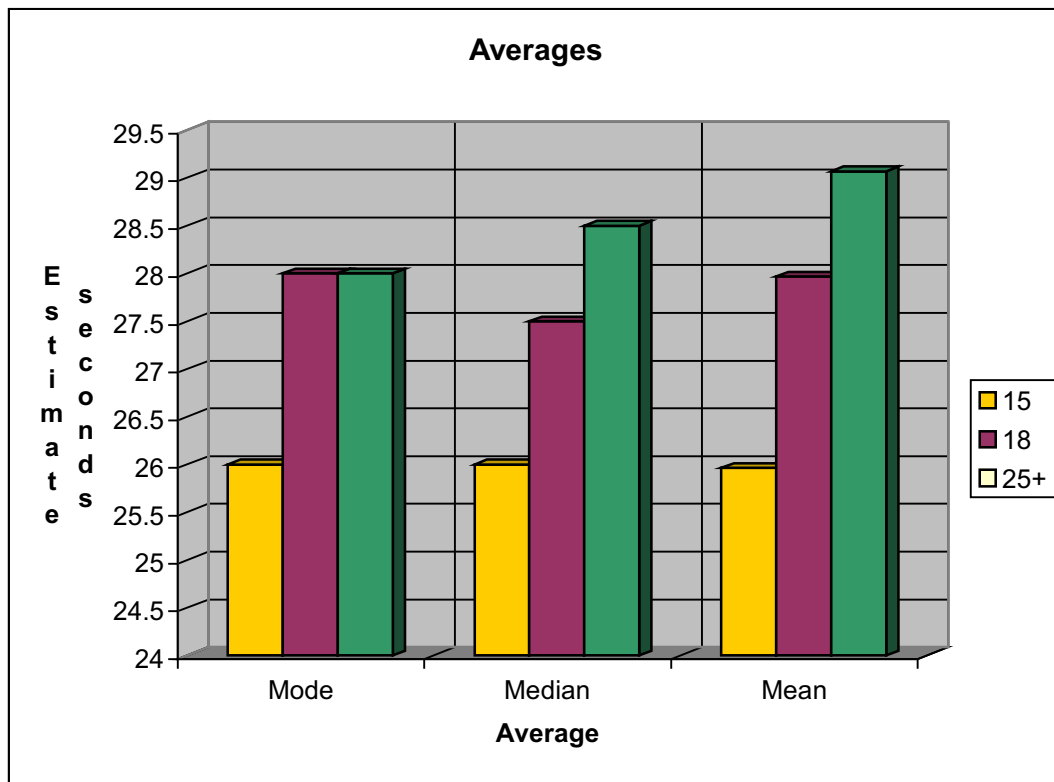
The above graph is a scatter graph that shows the comparison between the three different age groups that I have looked at. As the key shows yellow is 25+, 18 is pink and 15 is navy blue. The bottom X-axis is the estimate number and the Y-axis is the time the estimated in seconds. It also has a line of best fit for each age group that will help us see the trend that each point on the graph follows. The graph shows that age 15 has a lower starting estimate value and a higher finishing value than the other two ages; this means that the range for this age is quite big. The range for age 18 and 25+ seems to be similar by looking at this graph because it has a similar starting and finishing value..

## Line Graph



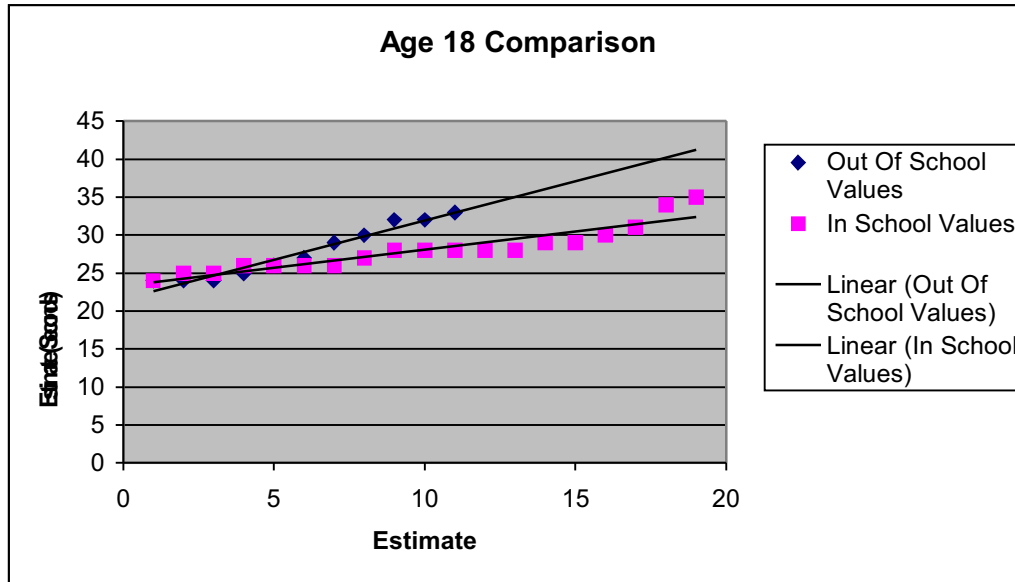
The above graph is using the same data as the scatter graph but is put in the form of a line graph. This graph gives a clearer example of how the different age groups differ in how they estimate time. It shows again what the scatter graph shows, the range's for 18 and 25+ are similar and smaller than 15.

## Bar Chart



The above graph shows the 3 different types of averages (mean median and mode) and the difference between all of them for each age group. Each average has 3 bars, orange being 15, red being 18 and green being age 25 and above. The graph shows that on average the mean is higher than the median and mode. It also shows that for age 15, the mean median and mode are very similar. The biggest difference is between the mode and the median for age 25+.

## Scatter Graph



Unfortunately I could not get a set of data for age 18 completely from 1 college due to the fact that there were not 30 18 year olds, so I had to collect some data from people I knew outside of college. This graph above shows the comparison between students in college and 18 year olds out of college, the navy blue line shows the values for people outside of school and the pink for values taken from people at college. The graph shows that the two results have a very similar range (starting and finishing point), however, this can not be a completely accurate graph seen as more values were taken in school than outside of school.

## Histogram

<u>Range</u>	<u>Frequency</u>	<u>F.D.</u>
<u>20-22</u>	7	3.5
<u>22-24</u>	3	1.5
<u>24-26</u>	2	1
<u>26-28</u>	9	4.5
<u>28-30</u>	2	1
<u>30-32</u>	3	1.5
<u>32-34</u>	0	0
<u>34-36</u>	0	0
<u>36-38</u>	2	1

The above table shows the calculations we need to draw our histogram table. It has 3 columns, the range, the frequency and the frequency density

## Cumulative Frequency for age 15

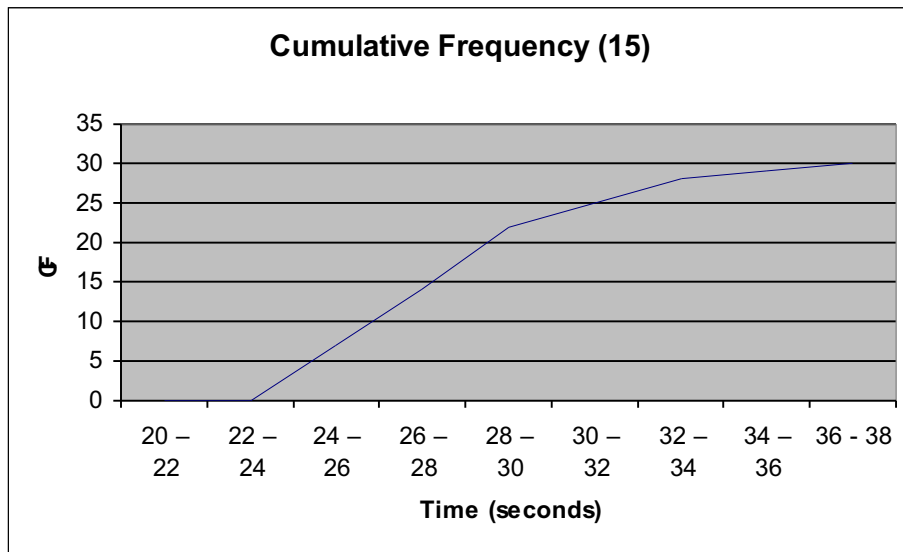
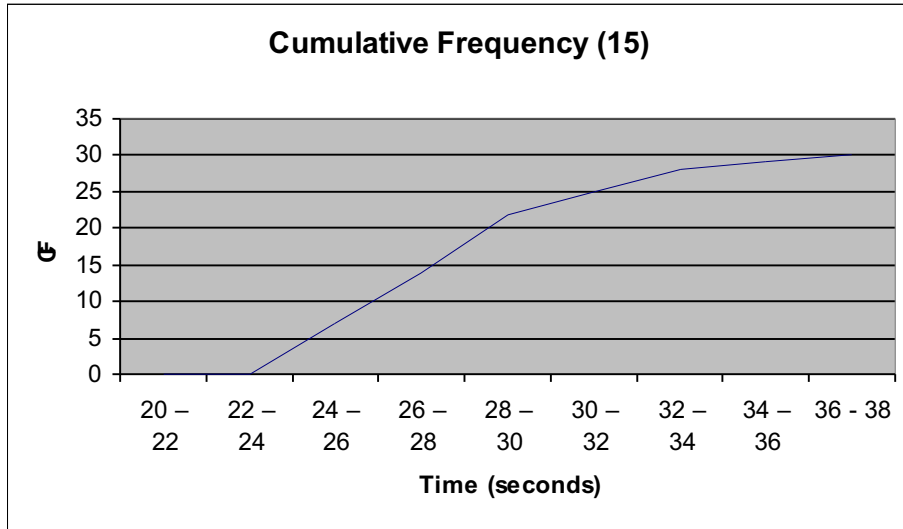
Time	Estimates	CF
20 – 22	7	7
22 – 24	3	10
24 – 26	2	12
26 – 28	9	21
28 – 30	2	23
30 – 32	3	26
32 – 34	0	26
34 – 36	0	26
36 - 38	2	28

## Age 18

Time	Estimates	CF
20 – 22	0	0
22 – 24	0	0
24 – 26	7	7
26 – 28	7	14
28 – 30	8	22
30 – 32	3	25
32 – 34	3	28
34 – 36	1	29
36 - 38	1	30

These cumulative frequency tables give us the point to draw a cumulative frequency diagram.





## **Evaluation**

Overall I felt this project has gone very well, the data was collected efficiently and the data processed into efficient charts, tables and graphs. The original data collected was only for two age groups ages 15 and 18, however, I felt that this did not give a very large range, even though I wanted this project to be based mainly around youngster, so I used data from people over the age of 25. This area is one of the first problems I encountered, the data set name is 25+, and I took this data from ages of 25 (my cousin) to over 70 (my Nan). If I were to do this test again, I would use a lot more age ranges and have them as close to each other, but due to time and availability I could not do this.

The second problem I faced was the age 18+ group, as this experiment was started in year 12, many of the students of the college had not reached 18 and was there for hard to get data from the same school, therefore out of school sources were used. If I was to do this again I was have an equal amount of data from two different schools to see if education had any effect on the estimation ability.

The results I did collect however, were quite good, they were good enough to make a number of graphs including scatter graphs and cumulative frequency graphs, as well as making calculations for mean, median and mode.

Looking at the graphs we can conclude that the age group 25+ had the best mean average estimation of time with less than a second away. We can also see that age 15 is the worst being at around 5 seconds off. So we can conclude from looking at this experiment that estimation improves with age. However, as we did not look at a very old age group eg 85+, we do not to the full extent of this claim.