About Quantitative Reasoning: Examples
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About Quantitative Reasoning

Examples

Two statements mean the same thing if one can always be substituted with the other.

Do these two statements mean the same thing?

A. 90% of basketball players are tall.
B. 90% of tall people play basketball.

No, these statements do not mean the same thing.

Statement A is referring to a percentage of basketball players. Of all basketball players, 90% are tall.
Tall People/Basketball Players x 100 = 90%

Statement B is referring to a percentage of tall people. Of all tall people, 90% play basketball.
Basketball Players/Tall People x 100 = 90%
Do these two statements mean the same thing?

A. Studies suggest eating a good breakfast leads to better grades.
B. Studies prove eating a good breakfast leads to better grades.

No, these statements do not mean the same thing.

Statement A is saying that studies suggest eating a good breakfast leads to better grades.
Statement B is saying that studies prove eating a good breakfast leads to better grades.

Saying that something is suggested by study is not equivalent to saying that finding is proven. To prove a finding is to indicate a definite causal relationship, while suggestions are much less definitive. Often, it is not possible to claim that something is caused by something else, because there are other variables that could have influenced the relationship.
Which study indicates that learning music aids in memory tasks?

A. In study A, some children chose to participate in music lessons and other children chose not to participate. Those children who chose to participate had 75% better recall on memory tasks after participating than children who did not participate.

B. In study B, half the children were randomly assigned to music lessons, and half the children were randomly assigned to the control group. Those children who participated in the music lessons had 5% better recall on memory tasks after participating than the control group.

Study B is the best study because it uses random sampling and random assignment. Using convenience samples of people who volunteer to participate is generally not good because the sample is not representative of the population.

There might be some characteristic that sets the people who volunteer apart from the people who don’t volunteer. For example, the children in Study A might be more likely to participate in music lessons anyway.
The table below represents the percent of individuals, 15-50+, who self-identify as workaholic or slacker. Indicate which of the following statements most accurately describes the data.

<table>
<thead>
<tr>
<th>Age</th>
<th>Workoholic</th>
<th>Slacker</th>
</tr>
</thead>
<tbody>
<tr>
<td>15-19</td>
<td>10</td>
<td>18</td>
</tr>
<tr>
<td>20-24</td>
<td>16</td>
<td>20</td>
</tr>
<tr>
<td>25-29</td>
<td>21</td>
<td>21</td>
</tr>
<tr>
<td>30-34</td>
<td>26</td>
<td>15</td>
</tr>
<tr>
<td>35-39</td>
<td>34</td>
<td>10</td>
</tr>
<tr>
<td>40-44</td>
<td>36</td>
<td>8</td>
</tr>
<tr>
<td>45-49</td>
<td>36</td>
<td>7</td>
</tr>
<tr>
<td>50+</td>
<td>20</td>
<td>13</td>
</tr>
</tbody>
</table>

A. 7% of the people who self-identified as slacker were 45-49.

B. 7% of the people 45-49 self-identified as slacker.

C. Among those people who self-identified as slacker, the percentage of those 20-24 was 20%.

D. Among those people 20-24, the percentage who self-identified as slacker was 20%.

Statement A: This statement is incorrect. It is referring to the total of the people who self-identified as slacker. Age 45-49/total slackers x 100 = 7%

Statement B: This statement is correct. It is referring to a percentage of the people who were 45-49. Slackers/Age 45-49 x 100 = 7%
Statement C: This statement is incorrect. It is referring to the total of the people who self-identified as slacker. Age 20-24/total slackers x 100 = 20%

Statement D: This statement is correct. It is referring to a percentage of the people 20-24 who self-identified as slacker. Slackers/Age 20-24 x 100 = 20%

Which statement most accurately describes the data shown in the pie chart?

A. 8% of people in the library are faculty
   This statement is true.

B. Undergraduates (45%) represent a greater portion of the library population than graduates (31%) and staff (16%) combined.
   This statement is incorrect. 31% + 16% = 47% > 45%