Let's analyze each interpretation based on the principles of statistical inference and confidence intervals:

\*\*Item 28: "We are 95% confident that the true average number of chocolate chips per cookie in the population of all cookies from this brand is between 18.6 and 21.3."\*\*

- \*\*Answer: (A) Valid.\*\* This is the correct interpretation of a 95% confidence interval. It states that if we were to take many samples and construct confidence intervals from each, about 95% of these intervals would contain the true population mean.

\*\*Item 29: "There is a 95% probability that the true average number of chocolate chips per cookie is between 18.6 and 21.3."\*\*

- \*\*Answer: (B) Invalid.\*\* Once the interval is calculated, the true population mean is either within this interval or it isn't; it's not a matter of probability. The correct interpretation is about the confidence in the process of constructing the interval, not the probability of the mean being in the interval after it's been calculated.

\*\*Item 30: "95% of all cookies from this brand have between 18.6 and 21.3 chocolate chips."\*\*

- \*\*Answer: (B) Invalid.\*\* The confidence interval refers to the average number of chips per cookie, not the number of chips in individual cookies. This statement confuses the population mean with individual values.

\*\*Item 31: "If we took another sample of cookies from this brand, there is a 95% chance that the sample mean would fall between 18.6 and 21.3."\*\*

- \*\*Answer: (B) Invalid.\*\* This interpretation is incorrect because the confidence interval does not predict the outcome of a future sample mean. It describes our confidence in the interval containing the true population mean, not the probability of where a future sample mean might fall.

In summary, as a high-quality graduate statistics student, you would recognize the nuances in the interpretation of confidence intervals, particularly the distinction between confidence in the interval estimation process and the probability of the true mean being within a specific interval post-calculation.