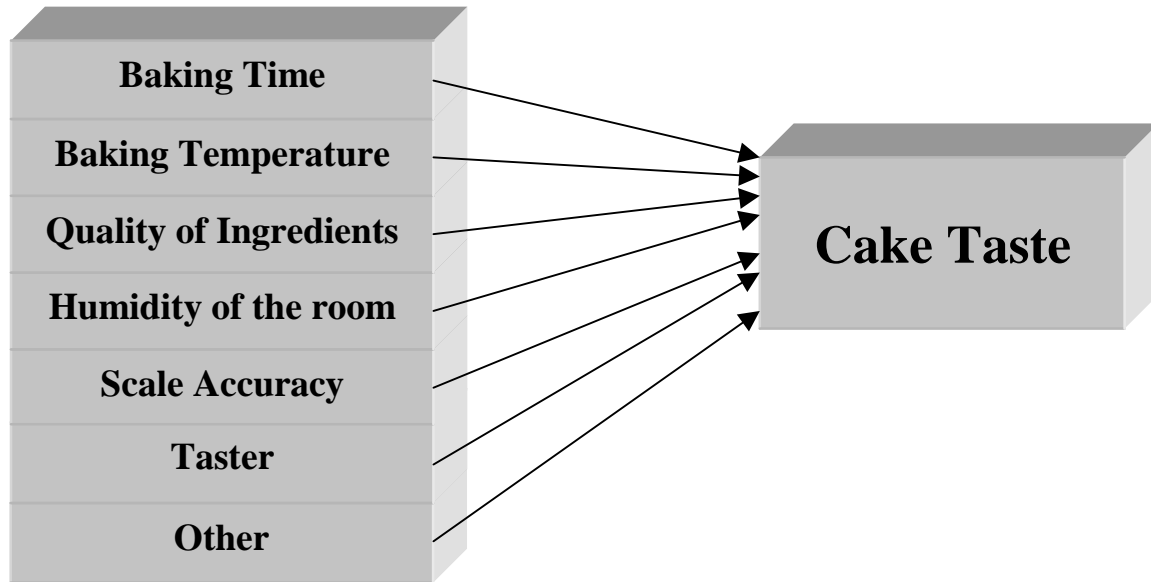


CAKE-BAKING EXPERIMENT

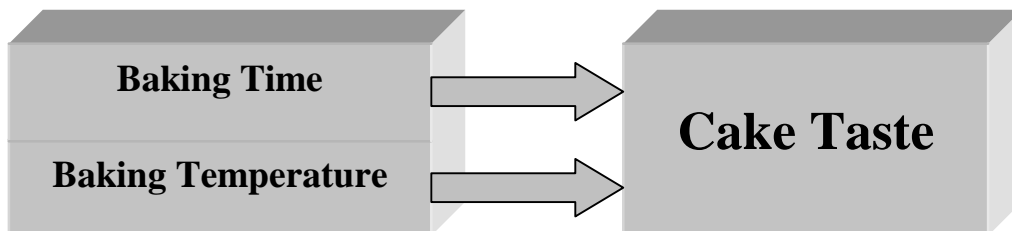
3. Selection of Factors

The quality of a cake is affected by several factors such as quality of ingredients, baking temperature and time, humidity of the room, taster, and other. The factors are displayed in the diagram below.



Only some of the factors can be controlled. For example, we cannot control the humidity of the room the cakes are baked unless the appropriate measuring equipment is available. The ingredients also can be varying quality from package to package.

In our experiment we will consider the impact of two of the above factors: baking time and temperature on the taste of a cake made from a mix, introduced in Section 2. The responses are ratings of the taste of the cakes given by tasters.



Assume that the range of temperatures to be studied is 300 F to 350 F and the range of times is 55 minutes to 65 minutes. A possible experimental strategy is to study the recommended times and temperatures and the extremes of the ranges. With this strategy,

the three temperature levels are to be studied are 325 F, 350 F, and 375 F, and the three time levels to be studied are 55 minutes, 60 minutes, and 65 minutes.

The following table the nine possible combinations of three temperatures and three times in the cake-baking experiment presented in a form of a two-way table:

		Time (in minutes)		
		55	60	65
Temperature	325 F			
	350 F			
	375 F			

The responses are ratings of the taste of the cakes given by tasters. The tasters score the cakes on a seven-point scale, with 0 meaning well below average, 1 below average, 2 somewhat below average, 3 average, 4 somewhat above average, 5 above average, and 6 well above average.

This experiment is an example of an experiment with replication. In this case, a replication consists of baking cakes at each of the nine combinations and then obtaining taste-test scores for each of the cakes.