

## 11.1: Introduction

 This is a photo of a pile of grocery store receipts. The items and prices are blurred.

Figure 11.1 The chi-square distribution can be used to find relationships between two things, like grocery prices at different stores. (credit: modification of work “The first few times I used my Asda 'bag for life' I left the receipts in the bottom of the bag” by Pete/ Flickr, Public domain)



Figure 11.1.1: The chi-square distribution can be used to find relationships between two things, like grocery prices at different stores. (credit: modification of work “The first few times I used my Asda 'bag for life' I left the receipts in the bottom of the bag” by Pete/ Flickr, Public domain)

Have you ever wondered if lottery winning numbers were evenly distributed or if some numbers occurred with a greater frequency? How about if the types of movies people preferred were different across different age groups? What about if a coffee machine was dispensing approximately the same amount of coffee each time? You could answer these questions by conducting a hypothesis test.

You will now study a new distribution, one that is used to determine the answers to such questions. This distribution is called the chi-square distribution.

In this chapter, you will learn the three major applications of the chi-square distribution:

1. the goodness-of-fit test, which determines if data fit a particular distribution, such as in the lottery example
2. the test of independence, which determines if events are independent, such as in the movie example
3. the test of a single variance, which tests variability, such as in the coffee example

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