

The Online Purchase of *My Baby Don't Tolerate*: Online-Only Merchants Vs Merchants With Retail Outlets

Background and Introduction

In the first part of this study, we examined the online purchase of a Lyle Lovett CD, *My Baby Don't Tolerate*, with respect to the CD cost and the shipping and handling charges. We found that there was a great difference in cost for the CD among the 30 online merchants in our sample; that there was also a wide variation in the shipping and handling fees from merchant to merchant; and that there was no correlation between the price charged for the CD and the shipping and handling costs. This last trend was unexpected: a suspicious buyer might suspect that merchants routinely compensate for a low advertised CD price with an elevated shipping and handling charge – but they do not.

In this second part of our study, we will look at two distinct groups that characterize our data: a first group of 20 merchants whose business is uniquely online and a second group of ten merchants who have retail stores but who engage in Internet sales as well. A business that is uniquely online is, for example, Amazon.com. Walmart is an example of an enterprise with retail outlets that engages, nevertheless, in online sales at Walmart.com. Is there a difference in CD price or in shipping and handling charges between the two groups? Do merchants whose business is Internet-only charge more or less for *My Baby Don't Tolerate* than businesses that have actual store locations?

The Null and Alternative Hypotheses

For the purpose of this study, the sample size remains 30 as it was in the original experiment. The sample subgroups are 20 (online-only merchants) and 10 (merchants with retail outlets). Our two null hypotheses are that no significant difference in the means of these subgroups exists for CD price

$$H_0: \mu_{1CD} - \mu_{2CD} = 0$$

or for shipping and handling

$$H_0: \mu_{1SH} - \mu_{2SH} = 0$$

The alternative hypotheses are that a significant difference exists in the means of the sample's subgroups. This would imply that there is a distinction in CD price between the two subgroups in the sample

$$H_A: \mu_{1CD} - \mu_{2CD} \neq 0$$

and there is a difference in shipping and handling charges between the two subgroups.

$$H_A: \mu_{1SH} - \mu_{2SH} \neq 0$$

Since we are dealing with such a small sample and since our data is non-critical (does not deal with questions of life and death), α is set at .10. Since we have two sets of

hypotheses, however, we will perform Bonferroni's Adjustment to correct for that fact, dividing α by 2, the number of hypotheses, and reducing it to .05.

Methodology

Using the original sample of 30 Google-generated online merchants, an independent t-test was run using SPSS software. The variables for the independent samples test included the original variables: One_CD_Cost and Standard_Shipping_and_Handling. A third "grouping" variable was included for the independent t-test: Online_Only_or_Store_Also. CD Merchants whose business is uniquely online were assigned the value "1" in Online_Only_or_Store_Also. Those whose business is conducted primarily in retail stores but who also sold CDs online were assigned the value "2" in that field.

Results of the T-Test for Independent Samples

The mean and standard deviations for the two subgroups were as follows:

Group Statistics

	Online_Only (1) or_Store_Also (2)	N	Mean	Std. Deviation	Std. Error Mean
One_CD_Cost	1	20	\$13.6570	\$1.88850	\$.42228
	2	10	\$13.9510	\$1.14884	\$.36329
Standard_Shipping_and_Handling	1	20	\$2.4025	\$1.13200	\$.25312
	2	10	\$3.0560	\$1.17629	\$.37197

Not surprisingly for such a small sample, the results of Levene's Test for homoscedasticity was nonsignificant for the subgroups of each of the variables.

	F	Sig.
One_CD_Cost	2.696	.112
Standard_Shipping_and_Handling	.008	.931

Neither the significance for equality in subgroup standard deviations for One_CD_Cost (.112) nor the significance for equality in subgroup standard deviations for Standard_Shipping_and_Handling (.931) was small enough to approach the required .05.

Similarly, the two-tailed significance of the t-test for equality of means between the two subgroups for each variable did not approach the .05 that would be necessary for the test to be considered statistically significant. This was true for both CD cost and for shipping and handling; and it was true whether equal variances were assumed or not. With equal variances, or homoscedasticity, assumed, the two-tailed significance in the t-test for equality between the means of the 2 subgroups ($p = .656$ for the One_CD_Cost

subgroups and $p = .152$ for the Standard_Shipping_and_Handling subgroups) were not significant at $\alpha = .05$. Without equal variances not assumed, the two-tailed significance was .602 for the One_CD_Cost online-only subgroups as compared to .164 for the two Standard_Shipping_and_Handling subgroups.

	t	df	Sig.(2-tailed)
One_CD_Cost	-.450	28	.656
Standard_Shipping_and_Handling	-1.472	28	.152

In other words, we fail to reject the null hypotheses for both compared subgroup means.

Interval estimation shows the same results in a different manner where $\mu_1 - \mu_2 = 0$ lies between the lower and upper limits of the 95% confidence intervals:

For the CD cost with equal variances assumed,

$$T_{\alpha=.05, df28} \text{ } -\$1.63198 < \mu_{1CD} - \mu_{2CD} < \$1.04398$$

With equal variances not assumed the interval was

$$T_{\alpha=.05, df28} \text{ } -\$1.43761 < \mu_{1CD} - \mu_{2CD} < \$.84961$$

For standard shipping and handling with equal variances assumed,

$$T_{\alpha=.05, df28} \text{ } -\$1.56301 < \mu_{1SH} - \mu_{2SH} < \$.25601$$

With equal variances not assumed the interval was

$$T_{\alpha=.05, df28} \text{ } -\$1.60075 < \mu_{1SH} - \mu_{2SH} < \$.29375$$

95% Confidence Interval of the Difference

	Lower	Upper
One_CD_Cost	-\$1.63198	\$1.04398
Standard_Shipping_and_Handling	-\$1.56301	\$.25601

Effect Size: The Meaning of the Difference Between Means

In order to evaluate the difference between the means of the subgroups for One_CD_Cost we use the formula:

$$\frac{\bar{X}_1 - \bar{X}_2}{\sqrt{\frac{SS_1 + SS_2}{n_1 + n_2 - 2}}} = \frac{-.294}{\sqrt{\frac{68.4 + 11.7}{28}}} = -.17$$

This is a very small effect size implying that the difference between the means is not very important.

We then perform the same operation for the Standard_Shipping_and_Handling subgroups.

$$\begin{aligned} & \frac{-.6535}{\sqrt{\frac{24.32 + 12.42}{28}}} \\ & = -.59 \end{aligned}$$

This is a moderate effect size, implying that the difference between the means is more important. Of course, given the extremely small size of our sample, d could be appreciably different in both cases if the experiment were repeated.

Implications

Since our sample size for this experiment is extremely small ($n = 30$), the experiment potentially lends itself to a Type 2 Error, the acceptance of the null hypothesis in cases where it should be rejected. A study of 30 merchants is not robust, so we cannot know if our results of a nonsignificant difference between the subgroup means are due to sampling error or to this lack of power.

From a descriptive point of view, however, the study is not without interest. Indeed, it would seem from a comparison of the means between the two groups of merchants that **those whose business is online-only charge less for My Baby Don't Tolerate and for shipping and handling the CD than the merchants whose primary business is transacted in stores**. Is this sampling error or a trend?

It may be sampling error, but it would make sense that merchants who sell their CDs in stores consider those sales to be their primary source of revenue and that they charge more for online service since it is not their specialty. Since they pay tremendous overhead for their stores, they possibly wish to encourage visits to those stores where a customer might buy other things in addition to the CD that he or she came to buy. It would also make sense that online CD stores charge less for the CD and for its shipping and handling in order to compete with the actual stores where the desired merchandise – in this case, *My Baby Don't Tolerate* – is more quickly obtainable.

These trends in the data point to the need for further investigation. It might be interesting for *Consumer Reports* or other marketing researchers to perform the *My Baby Don't Tolerate* experiment with a larger sample size in order to educate the consumer as to what kind of merchant to choose for his or her online CD purchases.