Evaluative Report
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MoneySavvy GENERATION®
HELPING KIDS GET SMART ABOUT MONEY®

Introduction

The purposes of this study are to: 1) measure the effectiveness of a program called Money Savvy Kids® on the attitudes and knowledge of children in schools in Washington State.

Money Savvy Kids® is curriculum developed by Money Savvy Generation of Lake Bluff, Illinois. The curriculum includes eight lessons:

- The History of Money
- Where Does Money Come From?
- Kids Can Earn Money Too!
- Saving Money and Bank Field Trip
- Spending Money
- Donating Money
- Investing Money
- Family Money Press Conference

An important part of Money Savvy Kids® curriculum is the Money Savvy Pig®. This is a four slot piggy bank. It provides teachers and parents with a fun and interesting way to introduce children to saving, spending, investing, and donating. Each child participating in the program receives a Money Savvy Pig®. During the 2011-2012 school year, approximately 90 elementary school classrooms received Money Savvy Kids® materials and curriculum training. Training was provided via the participants' use of self-study materials. They were asked to implement the program in their classrooms and to use a pre-and post-test with the students.

To investigate the effectiveness of this program, Dr. Mark Schug of the Center for Economics Education at the University of Wisconsin – Milwaukee, developed surveys (see Appendix A) measuring student beliefs about savings habits, handling money, the role of business, etc. Dr. Schug had a literacy expert check the questions for roughly a second grade reading level. This survey has been used in each subsequent evaluation study since the first such study at the end of the 2003-2004 school year. This study was featured in the academic journal *The Social Studies* in Spring 2005 (Schug & Hagedorn, 2005). Several items were reworded for greater simplicity and thus clarity in Fall 2008.

This past year, results from a large scale study (N over 2000), were used in a psychometric evaluation of the instrument (factor analysis and subscale reliability). On the basis of these results, two psychometrically unsatisfactory items were substantially changed. The "saving money is greedy" item was replaced with "I'm too young to need a long term goal for my money." The "business people help others by providing them with goods and services" was replaced with "I can save money when I spend my money very carefully." The object here was to remove confusing items and add items similar to others in intent, but with different wording. The first item about knowing how to handle money was reworded negatively to ensure that students thought about it. Finally, the simple 3-point Likert scaling (agree, unsure, disagree) was replaced by the standard 5-point Likert scale. A full quantitative psychometric analysis of these results will be completed this fall.

This extensively revised survey was given to students before receiving their Money Savvy Pigs and after they had completed the curriculum. The analyses this academic year were based upon 864 tests where we could match individual pre-tests with individual post-tests. These tests came from 26 schools and 49 individual teachers.

This report presents the interpretation of the results of those surveys followed with extensive supporting analysis.

Executive Summary Conclusions

Overall, the aggregate data indicate that the Money Savvy Kids® program was effective in positively affecting students' attitudes and knowledge about spending, saving and investing money. The paired (matched) samples data for these elementary students indicates statistically significant improvements on 9 of the 10 items.

The items for which there was the most change (as indicated by small effect sizes) were item #1 and #9. Item #1 states: "I don't know very much about how to handle my money. After instruction 12.2% more disagreed with this and 6.3% fewer were unsure. Item #9 states: "I want to spend the money I earn right away." After instruction, 13.6 % more students disagreed with this, 1.2 % fewer were unsure, and 12.4% fewer agreed.

Interestingly, there was no significant change on item #8, that "it is important for families to keep money in real banks," although over 50% believed this before instruction.

The remainder of the statistically significant changes had very small effect sizes, but the measured changes were large enough to indicate statistically they were not likely to have occurred by chance and thus may be attributed to the curriculum and the teachers' use of it. In addition, as many of the positive attitudes towards saving money and making donations, are counter-popular culture, reinforcing them is certainly a value added.

In this evaluator's professional opinion, these data indicate that the Money Savvy Kids® curriculum continues to positively impact the financial attitudes and understanding of the children who participated in this study from Washington State. In addition, changes to procedures for administering and collecting completed tests as well as the wording changes, seem to be yielding far more and far better data, although going from the 3-point Likert format to the 5-point, may be too difficult for 1st grade students. Psychometric analyses will be conducted to assess this possibility.

Matchable tests are always better than independent samples and better worded instruments enhance validity. Overall, these results are consistent with those found in previous studies in both urban and suburban Chicago, in Cleveland, Ohio, and in North Dakota. What these studies collectively suggest is that the Money Savvy Kids® curriculum is effective with a wide variety of English reading students.

Methodology

The 2012 revised Money Savvy Kids® Assessment is a 10 item, Likert scale instrument. A five point response format (instead of the original 3-point) was used: "totally agree" (with a value of 5), "agree" (with a value of 4), "unsure" (with a value of 3), "kind of disagree" (with a value of 2), and "totally disagree (with a value of 1).

The completed pre and post-tests include the participating students' names. This allows for matching individual pre and post-tests. Once matched and recorded, either a paired-samples t-test or the non-parametric Wilcoxon Signed Ranks test would be performed on the data to

determine if student responses changed from pre to post in a statistically significant manner. The paired samples t-test is appropriately used if the data did not differ significantly from a normal distribution. Normality is determined using the Kolmogorov-Smirnov test of normality (with Lillefiors correction) and the Shapiro-Wilk test. If the data do differ significantly from the normal distribution, one uses the non-parametric Wilcoxon Signed Ranks test.

Any statistically significant changes from pre to post will be identified and interpreted. A statistically significant difference in means from pre to post indicates the likelihood that such a difference in mean in the population would occur by chance. For instance, an increase of mean score on Item #3 of .31 (on a scale of 1 to 5) occurs by chance only once in a thousand, as indicated by a p value equal to .001. While this information implies statistical significance (likelihood of occurring by chance), it says nothing about "how big" or "how important" a change of .31 is. To begin to understand these issues, one calculates effect sizes. The effect size is essentially the ratio of the change to the standard deviation of the change scores. If the standard deviation of the change scores for Item #3 were around .3, the effect size would be about 1, indicating the change was roughly one whole standard deviation. In the literature, such an effect size is considered "large" (Kirk, 1995). If the standard deviation of the change scores was around 3 (indicate great variability in student responses to Item #3), the effect size would only be .10 – representing a change of about $1/10^{th}$ of a standard deviation. This effect size is considered "small," even though the likelihood that such a change occurred by chance is very unlikely.

The eta squared statistic is considered as an effect size as well (it is most commonly used in analyses of variance but can certainly be used with paired samples analyses), but it is more commonly thought of as a measure of the amount of variance explained in the post-test as based upon the information from the pre-test. In this respect it is similar to the r-squared from correlational or regression studies. In light of this interpretation, a smaller eta squared might be more desirable if our desired outcome was for the students to learn more, and for their post-test scores to go up, reflecting this. Why? If how the students did on the post-test depends heavily on how they did on the pre-test, one could assume that this is due to personal characteristics (e.g. reading ability) that have not changed due to this curriculum. If the eta squared is smaller, whatever changes occurred from pre to post do not depend on factors related to the pre-test but to something that happened between the pre and post-test, namely, the Money Savvy Pig intervention. Eta squared values can be categorized, as suggested by Cohen, similarly to r-squared values: 0.01 small, 0.06 medium, and 0.14 large.

More pre-tests were received than post-tests. This is a common occurrence in year-long external curriculum projects: by the end of the academic year teachers may forget to administer post-tests or feel too pressed for time to do so. Nevertheless, this academic year we could match 864 individual pre and post-tests from 26 distinct schools and 49 individual teachers. This sample is sufficiently large to justify no further investigation of unmatched pre- and post-tests using independent samples tests (such as the independent samples t-test or the Mann-Whitney U test).

Results

Matched Tests: Mean Item Changes

Item response means and standard deviations were calculated for the combined group of elementary students (N=864). These are provided in Table 1. When the sample size ("N") is less than 864 for a particular item, it indicates that a certain number of students left this item blank.

The data for every single item differed from normal with a statistical significance less than 1 in 1000 as determined by both the Kolmogorov-Smirnov and Shapiro-Wilks tests. Because of this, the Wilcoxon Signed Ranks test was used to determine if there were any statistically significant changes from pre to post.

Table 1. Descriptive statistics for paired samples data elementary students.

	N	**Pre**	**SD**	**Post**	**SD**	**Desired change/achieved**
Item 1	864	2.981	1.5863	2.63	1.752	Decrease, yes
Item 2	849	3.20	1.6434	3.45	1.721	Increase, yes
Item 3	845	2.94	1.659	2.73	1.775	Decrease, yes
Item 4	850	3.22	1.704	3.07	1.670	Decrease, yes
Item 5	847	3.22	1.663	3.41	1.763	Increase, yes
Item 6	832	3.03	1.169	2.90	1.602	Decrease, yes
Item 7	834	2.98	1.570	2.73	1.7832	Decrease, yes
Item 8	844	3.26	1.708	3.27	1.7475	Increase, yes
Item 9	844	2.96	1.776	2.49	1.7443	Decrease, yes
Item 10	861	3.29	1.680	3.48	1.7813	Increase, yes

Table 2. Significantly changed item response averages and effect size of changes.

Item	Z value	2-tailed significance	Effect size	Described Effect Size
1. I don't know very much about how to handle my money.	-5.27	0.000	-0.21	Small
2. I can save money when I spend my money very carefully.	-4.65	0.000	0.15	V. Small
3. It is important to have the things I want when I want them.	-3.46	0.001	-0.12	V. Small
4. It is best to put the money you save in your room at home.	-2.15	0.032	-0.09	V. Small
5. It is important to save for the things that I want to buy in the future.	-3.28	0.001	0.11	V. Small
6. When I invest in stocks, I will always make money and never lose money.	-2.14	0.033	-0.10	V. Small
7. I'm too young to need a long term goal for my money.	-3.57	0.000	-0.15	V. Small
8. It is important for families to keep money in real banks.	-0.22	0.826		
9. I want to spend the money I earn right away.	-7.67	0.000	-0.27	Small
10. When I donate money it helps other people and it helps me too.	-3.91	0.000	0.11	V. Small

Table 3. Eta squared

Item	Eta squared	Interpretation
1. I don't know very much about how to handle my money.	0.03	Small
2. I can save money when I spend my money very carefully.	0.02	Small
3. It is important to have the things I want when I want them.	0.01	Small
4. It is best to put the money you save in your room at home.	0.01	Small
5. It is important to save for the things that I want to buy in the future.	0.01	Small
6. When I invest in stocks, I will always make money and never lose money.	0.01	Small
7. I'm too young to need a long term goal for my money.	0.02	Small
8. It is important for families to keep money in real banks.	0.00	Small
9. I want to spend the money I earn right away.	0.07	Medium
10. When I donate money it helps other people and it helps me too.	0.02	Small

What Tables 1, 2 & 3 tell us about student responses to individual items.

In general these two tables show that there were statistically significant improvements in student understanding on all items on the assessment but one, item 8, which were analyzed using paired samples techniques. The change from pre to post on items 7 of the items, while statistically significant, had effect sizes that were less than 20% of a pooled standard deviation.

Following these written descriptions is a table showing how student responses changed from pre to post in terms of percentages, and bar charts indicating the percentage of responses in each of the 5 Likert categories.

The average response of the students to Item #1 changed from 2.98, leaning towards unsure to 2.63, which is more disagreeing. This is appropriate for this negatively worded item about knowing how to handle one's money. This indicates an improvement in student self-confidence regarding the proper handling of money. The two-tailed significance implies that this improvement in average score could only have occurred by chance less than 1 in 1000 times. The 0.21 effect size indicates that this improvement is 21% of an average standard deviation in size. Cohen considers this a "small effect." The eta-squared is small.

The average response of the students to Item #2 changed from 3.20, near unsure leaning towards agreeing, to 3.45, which is further towards agreeing. This indicates an improvement in student understanding, because it is appropriate for students to know that savings occurs with careful spending. The two-tailed significance implies that this improvement in average score could only have occurred by chance less than 1 in 1000 times. The 0.15 effect size indicates that this improvement is roughly 15% an average standard deviation in size. Cohen considers this a "very small effect." The eta-squared is also small.

The average response of the students to Item #3 changed from 2.94, on the disagreeing side of unsure, to 2.72, which is more strongly disagreeing. This indicates an improvement in student understanding, because it is appropriate for students to disagree with the notion that they should have things when they want them. The two-tailed significance implies that this improvement in average score could only have occurred by chance 1 in 1000 times. The 0.12 effect size indicates that this improvement is 12% of an average standard deviation in size. Cohen considers this a "very small effect." The eta-squared is small.

The average response of the students to Item #4 changed from 3.22, unsure leaning towards "kind of agreeing" to 3.07, which is more unsure, or disagreeing. This indicates an improvement in students' perceptions that you should not save your money in your room. The two-tailed significance implies that this improvement in average score could only have occurred by chance less than 32 in 1000 times. The .09 effect size is a "small effect." The eta-squared is small, which suggests persistence of earlier views, despite instruction.

The average response of the students to Item #5 changed from 3.22, unsure leaning towards agreeing, to 3.41, which is more strongly agreeing. This indicates an improvement in student understanding, because it is appropriate for students to agree with the notion you should save for the future. The two-tailed significance implies that this improvement in average score could only have occurred by chance less than 1 in 1000 times. The 0.11 effect size indicates that this improvement is about one tenth of an average standard deviation in size. This is a very small effect size. The eta-squared is also small.

The average response of the students to Item #6 changed from 3.03, very close to unsure, to 2.90, which indicates more disagreement. This actually indicates an improvement in student understanding, because the average dropping indicates more students disagreeing that the stock market is a certain way to make money. The exact two-tailed significance implies that this change in average score could only have occurred by chance less than 33 out of 1000 times. The 0.10 effect size indicates that this decrease in score is 10% an average standard deviation in size. Cohen considers this a "very small effect." The eta-squared is small.

The average response of the students to Item #7 changed from 2.98, very close to uncertain, to 2.73, which is further towards disagreeing. This indicates an improvement in student learning because it is more appropriate for students to disagree with the idea that they are too young to have long term financial goals. The two-tailed significance implies that this change in average score could only have occurred by chance less than 1 out of 1000 times. The 0.15 effect size indicates that this improvement is 15% of an average standard deviation in size. Cohen considers this a "very small effect." The eta-squared is small.

The average response of the students to Item #8 changed from 3.26, leaning towards agreement to 3.27, just slightly more agreeing. This indicates an improvement in students' perceptions that their families should keep their money in banks. This slight improvement could have occurred by chance, so this change is not statistically significant. No effect sizes or eta squares were calculated.

The average response of the students to Item #9 changed from 2.96, leaning towards unsure, to 2.49, leaning more towards disagreeing. This indicates an improvement in student understanding because more students should disagree with impulsive/rapid spending right after earning. The two-tailed significance implies that this change in average score could only have occurred by chance less than 1 in 1000 times. The 0.27 effect size indicates that this improvement is roughly

27% of an average standard deviation in size. While small, this change had the largest effect size of all statistically significant changes. The eta-squared was the only one which was medium.

The average response of the students to Item # 10 changed from 3.29, learning towards agreeing from unsure, to 3.48, which leans towards total agreement. This indicates an improvement in student understanding because more students should agree that donating money helps the recipient and the donator. The two-tailed significance implies that this change in average score could only have occurred by chance 1 out of 1000 times. The 0.11 effect size indicates that this improvement is 11% of an average standard deviation in size. Cohen considers this a "very small effect." The eta-squared is also small.

These interpretations are also presented in terms of the changes in percentages of students picking each possible choice before and after being taught in Table 4. To better interpret Table 4, a series of bar graphs for each item are included as well. The vertical scales are the same for each pair of graphs: pre and post.

Table 3. Percentages of chosen responses to selected items on matched pre and post-measures.

Item	Response Category`	% students pre-test	% students post-test	Comments
1	1 total disagree 2 kind of disag 3 unsure 4 kind of agree 5 totally agree	28.7 14.1 13.9 16.9 26.4	47.5 7.5 7.6 8.9 28.5	Responses to this negatively worded item indicate that students believed that they did know about how to handle their money after participation. 12.2% more disagreed totally after, and 6.3% fewer were unsure.
2	1 total disagree 2 kind of disag 3 unsure 4 kind of agree 5 totally agree	26.7 10.8 14.4 12.1 35.9	27.2 5.9 9.4 9.5 47.9	While almost half (48%) believed they could save money by saving carefully before instruction, even more (57%) believed so after instruction. 5% fewer were unsure.
3	1 total disagree 2 kind of disag 3 unsure 4 kind of agree 5 totally agree	33.4 11.0 13.5 12.5 29.6	44.9 7.8 8.5 6.9 32.0	Less than half (44%) disagreeing with immediate gratification to begin with, jumped to almost 53% disagreeing after. Uncertainty about this dropped by 5%.
4	1 total disagree 2 kind of disag 3 unsure 4 kind of agree 5 totally agree	29.5 8.7 11.4 11.2 39.2	29.3 14.7 9.5 12.9 33.5	5.8 % more students disagreeing that you should keep money in your room at home. 1.9 % fewer unsure. 4% fewer agreeing with this after participation.
5	1 total disagree 2 kind of disag 3 unsure 4 kind of agree 5 totally agree	27.9 9.0 13.8 12.3 37.1	29.8 5.1 8.5 7.9 48.8	5 % fewer students disagreeing after instruction that saving for future is important. 5.3% fewer unsure about this and 7.3 % more agreeing.
6	1 total disagree 2 kind of disag 3 unsure 4 kind of agree 5 totally agree	13.5 10.1 52.4 7.8 16.2	32.8 8.5 21.5 10.3 26.8	17.7 % more disagreeing that you always make money on stocks. 30.9% fewer unsure.
7	1 total disagree 2 kind of disag 3 unsure 4 kind of agree 5 totally agree	28.3 11.0 22.5 10.2 27.9	45.3 7.2 8.8 6.2 32.5	13.2% more strongly disagreeing that they are too young to set up long term goals for their money. Uncertainty dropped by 13.7%
8	1 total disagree 2 kind of disag 3 unsure 4 kind of agree 5 totally agree	29.1 8.2 11.1 11.0 40.5	30.8 7.1 9.5 9.5 43.1	1.1% more agree that their family should keep money in real banks, although over 50% believed this before instruction. Uncertainty dropped by 1.6%.

9	1 total disagree 2 kind of disag 3 unsure 4 kind of agree 5 totally agree	38.9 7.8 7.6 10.3 35.4	51.4 8.9 6.4 5.9 27.4	13.6 % more students disagreeing, 1.2 % fewer unsure, and 12.4% fewer agreeing with the statement that they want to spend their money right away.
10	1 total disagree 2 kind of disag 3 unsure 4 kind of agree 5 totally agree	26.8 9.1 13.8 9.1 41.2	29.4 5.3 5.9 6.9 52.5	9.1% more agreeing that donating money helps both others and themselves, although even before instruction 50.3% of the students agreed with this. 7.9% fewer are uncertain about this.

Figure 1. Item 1: I don't know very much about how to handle my money.

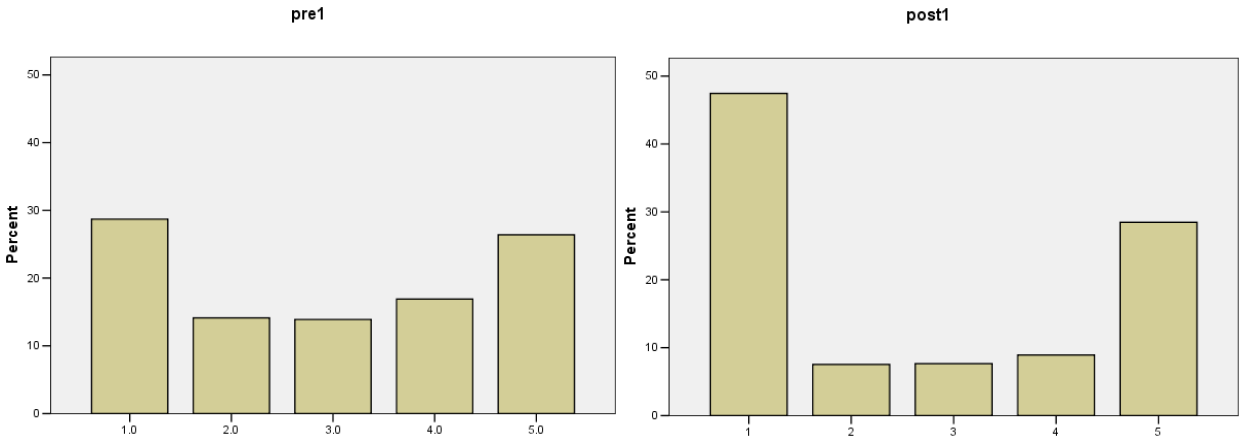


Figure 2. Item 2: I can save money when I spend my money very carefully.

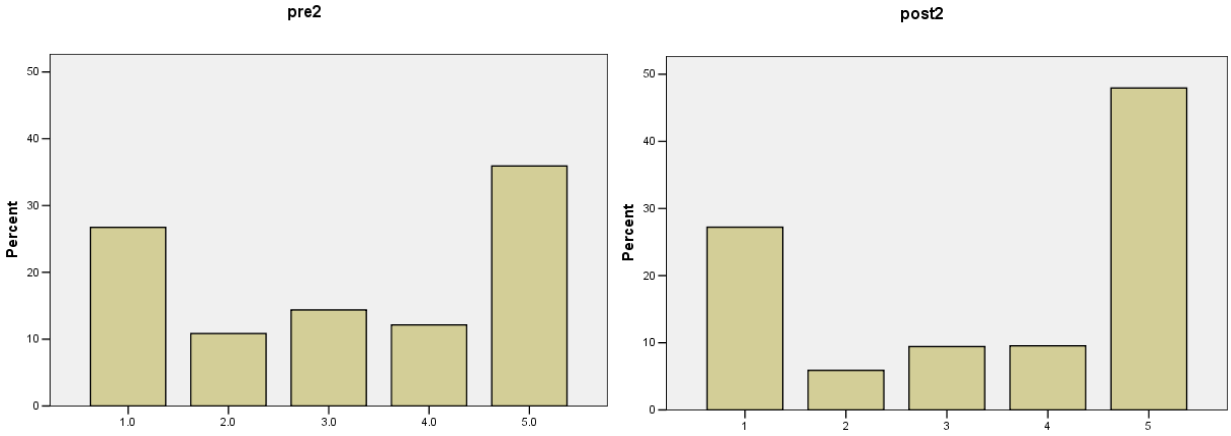


Figure 3. Item 3: It is important to have the things I want when I want them.

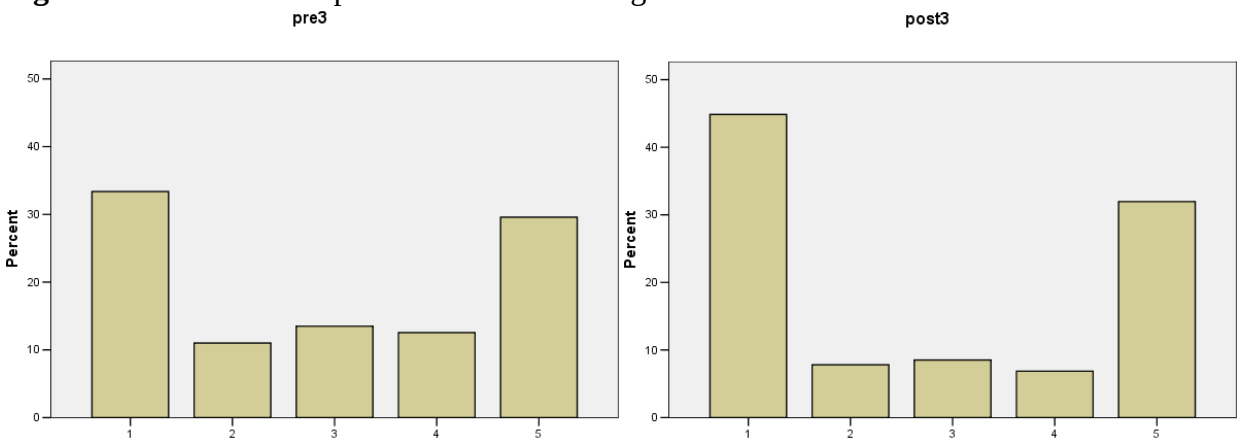


Figure 4. Item 4: It is best to put the money you save in your room at home.

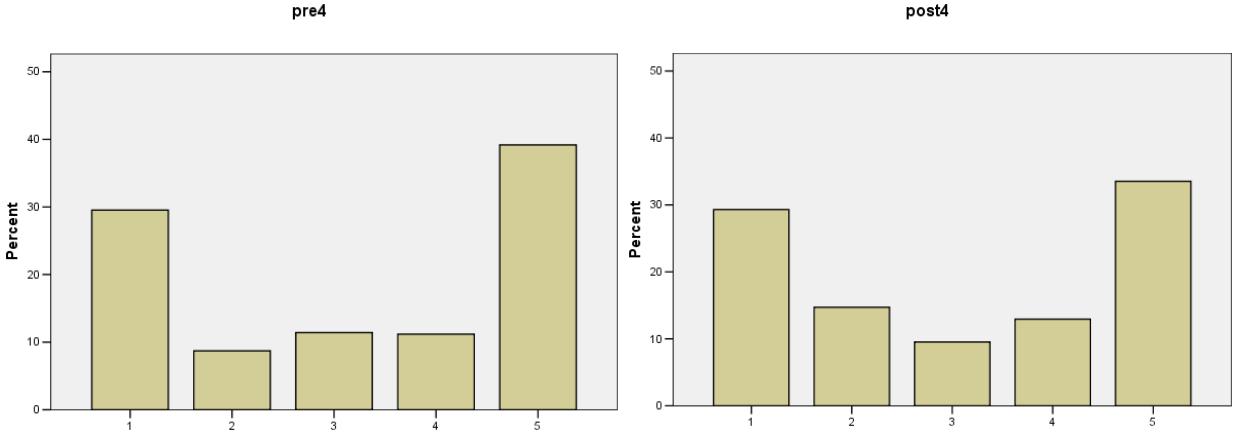


Figure 5. Item 5: It is important to save for the things that I want to buy in the future.

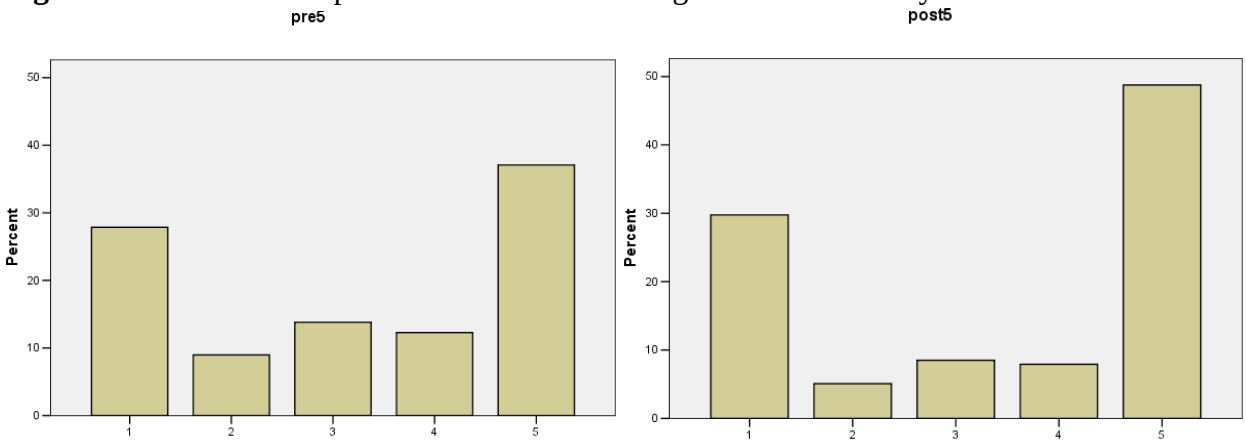


Figure 6. Item 6: When I invest in stocks, I will always make money and never lose money.

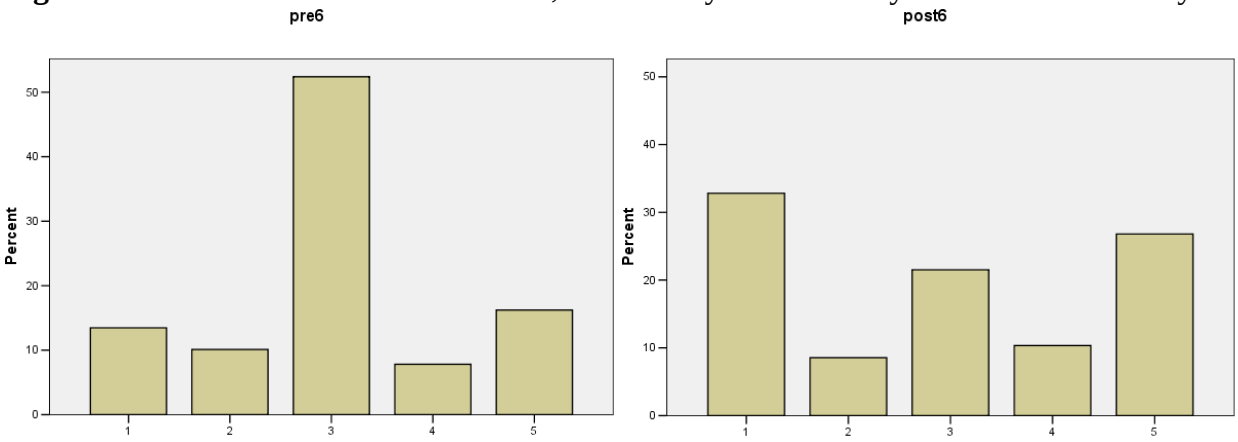


Figure 7. Item 7: I'm too young to need a long term goal for my money.

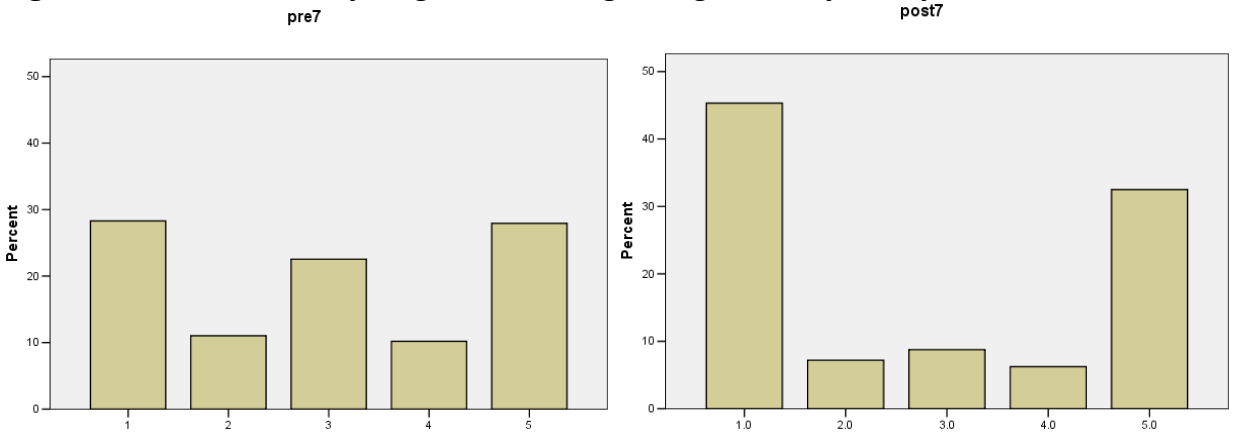


Figure 8. Item 8: It is important for families to keep money in real banks.

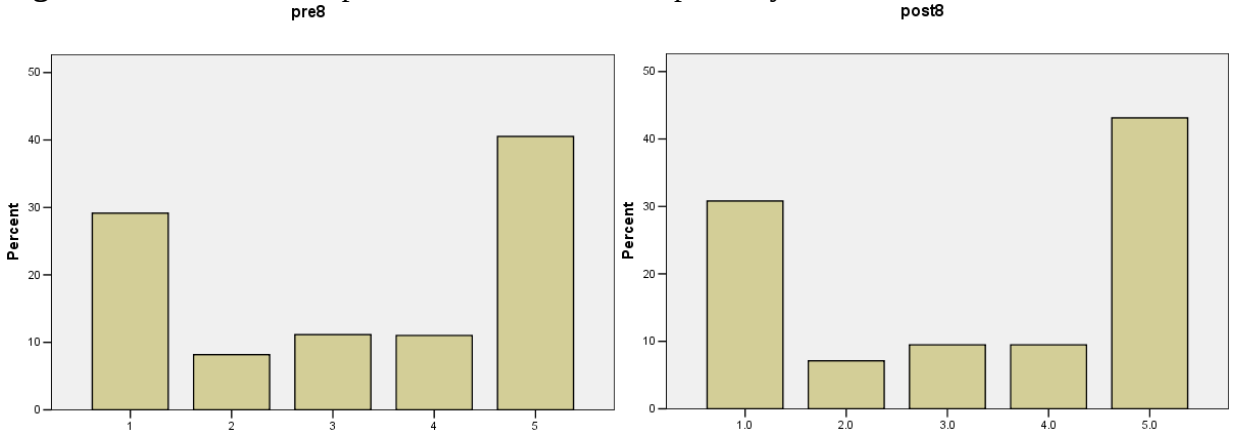


Figure 9. Item 9: I want to spend the money I earn right away.

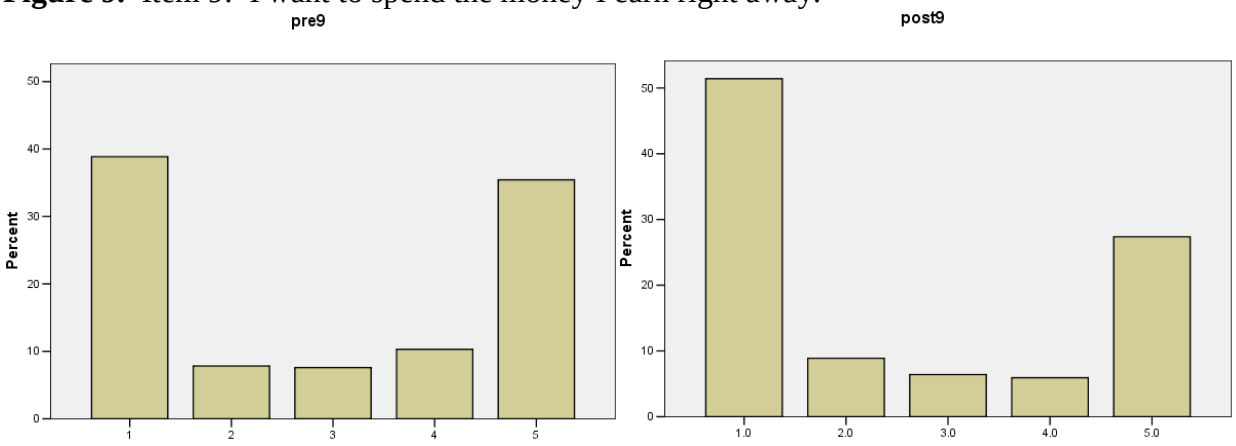
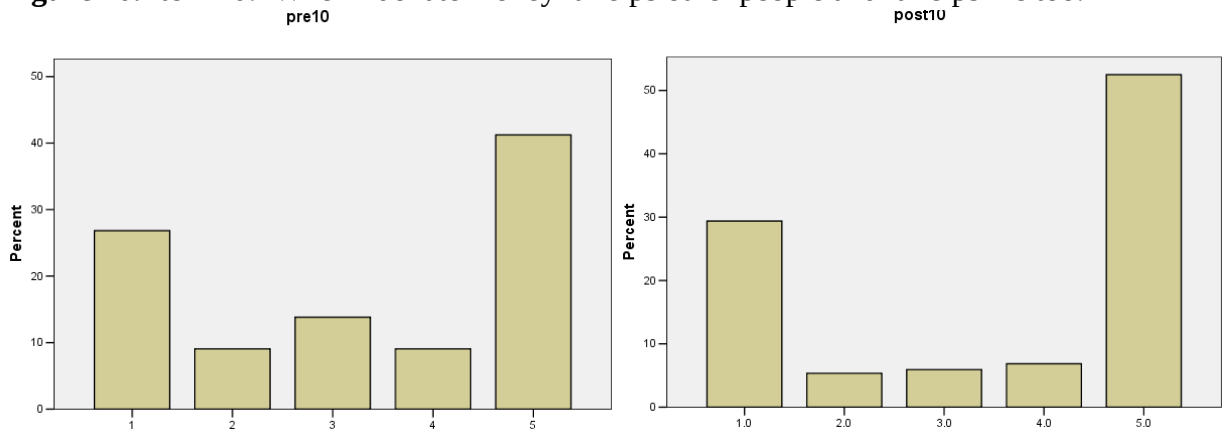


Figure 10. Item 10: When I donate money it helps other people and it helps me too.



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