Evaluative Report
Chicago Public Schools

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Introduction

The purposes of this study is to continue to measure the effectiveness of a financial literacy program called Money Savvy Kids™ to positively impact the attitudes and knowledge of children in Chicago Public Schools. 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 2012-2013 school year, over 48 elementary school classrooms at 27 schools 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 we have used a revised attitudinal survey originally developed by Dr. Mark Schug of the Center for Economics Education at the University of Wisconsin – Milwaukee. Both surveys (original and revised) solicit student beliefs about savings habits, handling money, the role of business, etc. The original survey, first used for the 2003-2004 school year and until the 2011-2012 school year, was featured in the academic journal *The Social Studies* in Spring 2005 (Schug & Hagedorn, 2005). Based upon a psychometric analysis of a large sample collected with the original survey, the survey itself was extensively revised – not in content, but wording, Likert scaling (3 to 5 point response format), item order, etc. See Appendix for the instrument. The analyses this academic year are based upon 1341matched pre and post-tests, using this revised survey. This report presents the interpretation of the results of those surveys followed with extensive supporting analysis. In other words, our conclusions begin now.

Executive Summary of Results and 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 students indicate statistically significant improvements on all 10 items.

The item for which there was the most change (as indicated by the largest effect size) was item #4. This item suggests that it is best to keep the money you save in your room at home. After instruction, 19% more students disagreed that you should keep money in your room at home The percentage of students who were unsure increased slightly by 1%.

The remainder of the statistically significant changes had small Cohen effect sizes, but the measured changes were large enough to indicate statistically that 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 contrary to 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 in the Chicago area. Overall, these results are consistent with those found in previous studies in Washington State (over several years); in Cleveland, Ohio; in North Dakota; and in the Chicago area over several years. What these studies collectively suggest is that the Money Savvy Kids™ curriculum is effective with a wide variety of English reading students.

Methodology

The original Money Savvy Kids™ Assessment is a 10 item, Likert scale instrument. A three point response format was used: "agree" (with a value of 3), "unsure" (with a value of 2) and "disagree" (with a value of 1). Dr. Schug had a literacy expert check the questions for roughly a second grade reading level. The revised Money Savvy Kids™ Assessment is still a 10 item, Likert scale instrument, but uses a 5-point scale.

The completed pre and post-tests include the participating students' names. This allows for matching individual pre and post-tests. Once matched and recorded, 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 Wilcoxon Signed Ranks test is the non-parametric equivalent to the paired or dependent samples t-test. It is used because the paired samples t-test assumes a normal distribution in the data, which these data are not (based upon Kolmogorov-Smirnov and Shapiro-Wilk tests of normality). This is not unusual in data coming from a 5-point Likert scale.

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 issue, one calculates effect sizes. One of the most well known effect size calculations derives from Cohen. The Cohen Effect Size is essentially the ratio of the change in mean 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" (Cohen, 1992; 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 to pressed for time to do so. In addition, students could be absent on either the pre or post-test administration day and in some cases the students might even use a nickname or first name only and thus be hard to match. Nevertheless, we could match 1341 individual pre and post tests from 27 distinct schools and 48 individual teachers. Because paired samples data are more informative than unmatched data from the same source, we did not analyze the unmatched data. In such a large sample, this was deemed unnecessary. In previous studies with other school districts, where both paired and independent samples data were available, the results were very similar.

Results

Mean Item Changes

Item response means and standard deviations were calculated for the combined group of participating students for whom we had both pre and post tests (N=1341). These are provided in Table 1. When the sample size ("N") is less than 1341 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 from Chicago area students.

	N	Pre	SD	Post	SD	Desired change/achieved
Item 1	1341	2.52	1.510	2.00	1.401	Decrease, yes
Item 2	1332	4.17	1.196	4.32	1.126	Increase, yes
Item 3	1321	2.29	1.506	1.98	1.405	Decrease, yes
Item 4	1321	3.88	1.469	3.19	1.671	Decrease, yes
Item 5	1327	4.21	1.225	4.37	1.144	Increase, yes
Item 6	1321	3.27	1.205	2.87	1.539	Decrease, yes
Item 7	1319	2.58	1.506	2.05	1.458	Decrease, yes
Item 8	1321	4.36	1.173	4.48	1.055	Increase, yes
Item 9	1323	1.82	1.344	1.70	1.252	Decrease, yes

Item 10 1335 4.35 1.129 4.51 1.014 Increase, yes

Table 2. Wilcoxon Z (indicator of significant change) and Cohen effect size of changes.

Item	Z value	2-tailed significance	Cohen Effect size	Described Effect Size
1. I don't know very much about how to handle my money.	-10.64	0.000	0.30	Small
2. I can save money when I spend my money very carefully.	-4.08	0.000	0.11	V. Small
3. It is important to have the things I want when I want them.	-6.75	0.000	0.19	Small
4. It is best to put the money you save in your room at home.	-12.15	0.000	0.36	Small
5. It is important to save for the things that I want to buy in the future.	-3.99	0.000	0.11	V. Small
6. When I invest in stocks, I will always make money and never lose money.	-7.73	0.000	0.22	Small
7. I'm too young to need a long term goal for my money.	-10.02	0.000	0.29	Small
8. It is important for families to keep money in real banks.	-3.22	0.001	0.09	V. Small
9. I want to spend the money I earn right away.	-2.90	0.004	0.08	V. Small
10. When I donate money it helps other people and it helps me too.	-4.67	0.000	0.12	V. Small

Table 3. Eta squared

Item	Eta squared	Interpretation
1. I don't know very much about how to handle my money.	0.08	Medium
2. I can save money when I spend my money very carefully.	0.01	Small
3. It is important to have the things I want when I want them.	0.04	Small
4. It is best to put the money you save in your room at home.	0.11	Medium
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.	0.05	Small
7. I'm too young to need a long term goal for my money.	0.08	Medium
8. It is important for families to keep money in real banks.	0.01	Small
9. I want to spend the money I earn right away.	0.01	Small
10. When I donate money it helps other people and it helps me too.	0.01	Small

What Tables 1, 2 and 3 tell us about student responses to individual items.
In general the first two tables show that there were statistically significant improvements in student understanding/attitude on all ten of the items on the assessment. The individual item changes are described below in terms of averages based on the rating scale: 5 indicating total agreement, 4 indicating agreement, 3 indicating uncertainty, 2 indicating disagreement and 1 total disagreement. Following these written descriptions is a table and a series of bar charts showing how student responses changed from pre to post in terms of percentages of students responding to each response category before and after instruction. As mentioned in the methodology section, the third table of eta squared values indicate how much the pre-scores explain the variance in the post-scores.

The average response of the students to Item #1 changed from 2.52, leaning towards uncertainty to 2.00, more strongly disagreeing, which 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 0.30 effect size indicates that this improvement is 30% of an average standard deviation in size. Cohen considers this a "small effect." The eta-squared (.08) is medium.

The average response of the students to Item #2 changed from 4.17, leaning towards agreeing, to 4.32, which is further towards totally 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 0.11 effect size indicates that this improvement is roughly 11% an average standard deviation in size. Cohen considers this a "very small effect." The eta-squared (.01) is also small.

The average response of the students to Item #3 changed from 2.29, on the disagreeing side of unsure, to 1.98, 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 less than 1 in 1000 times. The 0.19 effect size indicates that this improvement is 19% of an average standard deviation in size. Cohen considers this a "small effect." The eta-squared (.04) is small.

The average response of the students to Item #4 changed from 3.88, leaning towards "kind of agreeing" to 3.19, which is on the agreeing side of uncertainty. 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 1 in 1000 times. The .36 effect size indicates that this improvement is 36% of an average standard deviation in size. Cohen considers this a "small effect." The eta-squared (.11) is medium, which suggests persistence of earlier views, despite instruction.

The average response of the students to Item #5 changed from 4.21, leaning towards agreeing, to 4.37, 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 (.01) is also small.

The average response of the students to Item #6 changed from 3.27, on the agreeing side of unsure, to 2.87, which, on average, indicates uncertainty. This actually indicates an improvement in student understanding, because the average dropping indicates more students disagreeing with this item which is appropriate for this item (the stock market is not 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 1 out of 1000 times. The 0.22 effect size indicates that this decrease in score is about 22% an average standard deviation in size. Cohen considers this a "small effect." The eta-squared (.05) is small.

The average response of the students to Item #7 changed from 2.58, on the disagreeing side of uncertain, to 2.05, which 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 0.29 effect size indicates that this improvement is almost one third of an average standard deviation in size. Cohen considers this a "small effect." The eta-squared (.08) is medium.

The average response of the students to Item #8 changed from 4.36, leaning towards agreement to 4.48, more strongly agreeing. This indicates an improvement in students' perceptions that their families should keep their money in banks. The two-tailed significance implies that this improvement in average score could only have occurred by a chance of 1 in 1000 times. The .09 effect size indicates that this improvement is about 9% of an average standard deviation in size. Cohen considers this a "very small effect." The eta-squared (.01) is also small.

The average response of the students to Item #9 changed from 1.82, leaning towards disagreeing, to 1.70, leaning even more towards totally 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 4 times out of 1000. The .08 effect size, very small, indicates that this improvement is 8% of an average standard deviation in size. The eta-squared (.01) is also small.

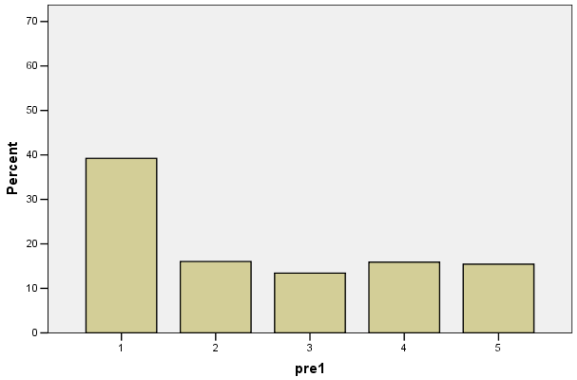
The average response of the students to Item # 10 changed from 4.35, learning towards strong agreeing, to 4.51 which leans towards total agreement. This indicates an improvement in student understanding because more students should agree that donating money helps the recipient and the donator. The two-tailed significance implies that this change in average score could only have occurred by chance less than 1 out of 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 (.01) is also small.

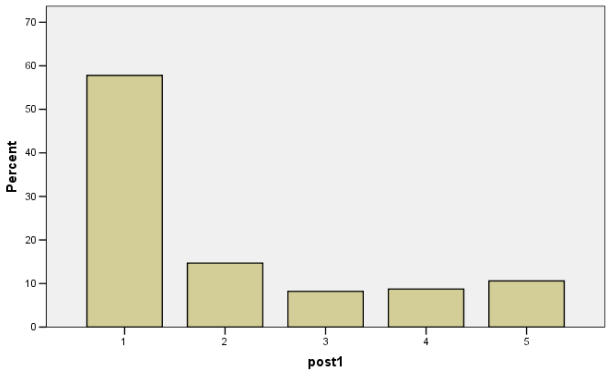
These interpretations are also presented in terms of the changes in percentages of students picking each possible choice before and after being taught in Table 4. To better interpret Table 4, a series of bar graphs for each item are included as well. The vertical scales are the same for each pair of graphs: pre and post. The horizontal scale – which is meaningless – may vary as an artifact of the software used.

Table 4. Percentages of chosen responses to selected items on matched pre and post-measures.

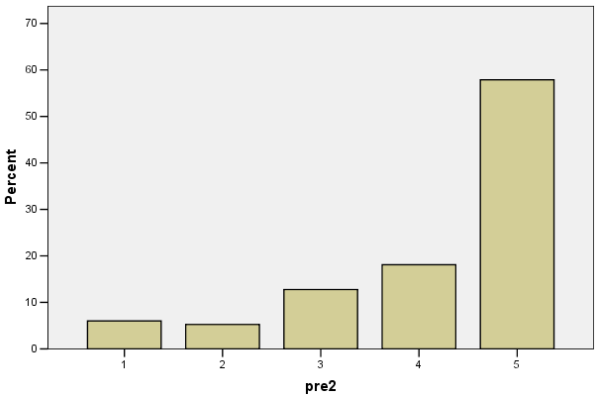
Item	Response Category`	% students pre-test	% students post-test	Comments ("agreeing" is the combination of "totally agree" + "kind of agree"; "disagreeing" is the combination of "totally disagree"+ "kind of disagree")
1	1 total disagree 2 kind of disag 3 unsure 4 kind of agree 5 totally agree	39.2 16.0 13.4 15.9 15.4	57.8 14.7 8.2 8.7 10.6	Responses to this negatively worded item indicate that students believed that they did know about how to handle their money after participation. 18.6% more disagreed totally after, and 5.2% fewer were unsure.
2	1 total disagree 2 kind of disag 3 unsure 4 kind of agree 5 totally agree	6.0 5.3 12.8 18.1 57.9	5.4 3.5 9.6 16.6 64.9	While a majority (76%) believed they could save money by saving carefully before instruction, even more (81.5%) believed so after instruction.
3	1 total disagree 2 kind of disag 3 unsure 4 kind of agree 5 totally agree	48.3 15.0 11.4 10.6 14.8	59.3 13.6 8.5 7.7 11.0	More than half (63.3%) disagreeing with immediate gratification to begin with, jumped to almost 73% disagreeing after (10% increase). Uncertainty about this dropped by 3% and those agreeing dropped by 6.7%.
4	1 total disagree 2 kind of disag 3 unsure 4 kind of agree 5 totally agree	13.7 7.8 8.8 15.9 53.8	27.5 12.9 9.8 13.2 36.6	19 % more students disagreeing that you should keep money in your room at home. 1.0 % more unsure. 20 % fewer agreeing with this after participation.
5	1 total disagree 2 kind of disag 3 unsure 4 kind of agree 5 totally agree	7.0 4.9 10.0 16.4 61.6	5.7 4.2 7.2 13.3 69.7	2 % fewer students disagreeing after instruction that saving for future is important. 2.8% fewer unsure about this and 5.0 % more agreeing.
6	1 total disagree 2 kind of disag 3 unsure 4 kind of agree 5 totally agree	11.0 7.6 46.6 12.8 22.1	30.3 11.7 21.9 12.9 23.2	23.4 % more disagreeing that you always make money on stocks. 25% fewer unsure. The percentage agreeing with this seem to persist after instruction
7	1 total disagree 2 kind of disag 3 unsure 4 kind of agree 5 totally agree	38.7 10.6 21.5 12.5 16.6	58.6 10.9 9.9 8.2 12.4	20% more strongly disagreeing that they are too young to set up long term goals for their money. Uncertainty dropped by 11.6%
8	1 total disagree 2 kind of disag 3 unsure 4 kind of agree 5 totally agree	6.2 4.2 7.5 11.5 70.6	4.6 3.0 6.5 11.4 74.6	2.8 % fewer disagree that it is important for families to keep money in real banks, although a small percentage do so. 1.0 % less unsure and 3.9 % more agreeing. While these are small changes, 82% agreed with this statement to begin with.
9	1 total disagree 2 kind of disag 3 unsure 4 kind of agree 5 totally agree	66.1 10.7 7.3 6.7 9.3	69.8 10.6 6.2 6.2 7.2	3.6 % more students disagreeing, 1.1 % fewer unsure, and 2.6% 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	5.5 3.4 8.8 15.4 66.9	4.3 2.0 6.7 12.2 74.7	4.6% more agreeing that donating money helps both others and themselves, although even before instruction 82% of the students agreed with this. 2.1% fewer are uncertain about this.

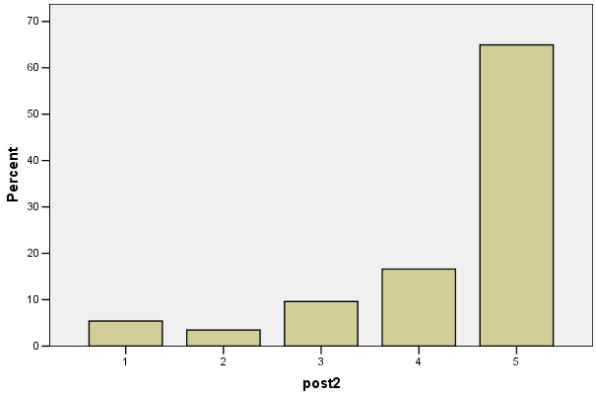
Item 1: I don't know very much about how to handle my money.



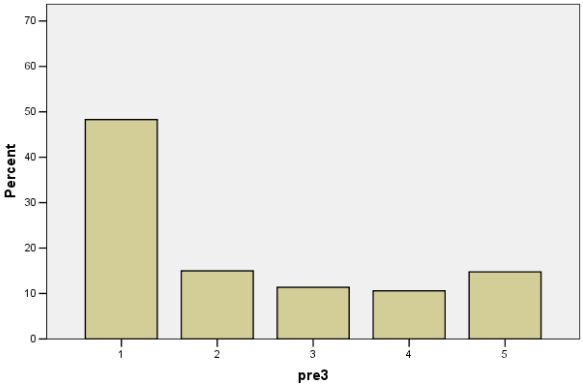


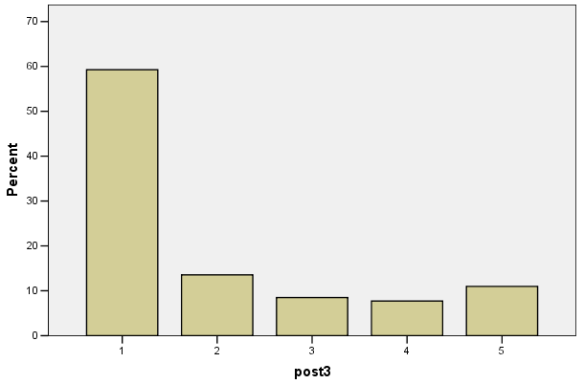
Item 2: I can save money when I spend my money very carefully.



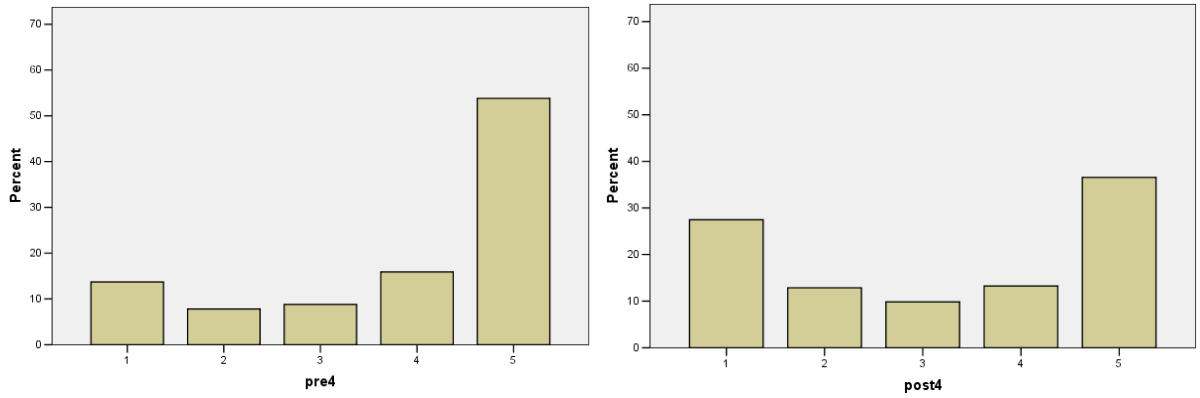


Item 3: It is important to have the things I want when I want them.

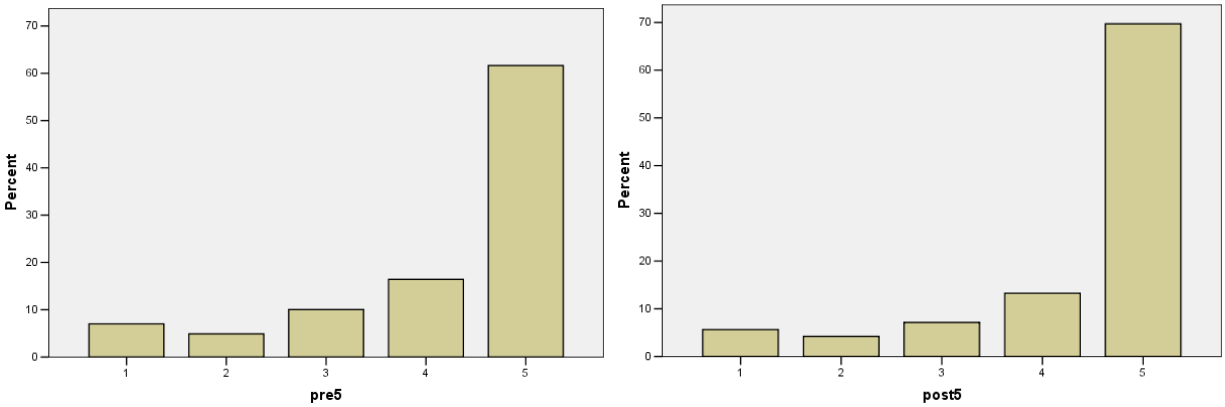




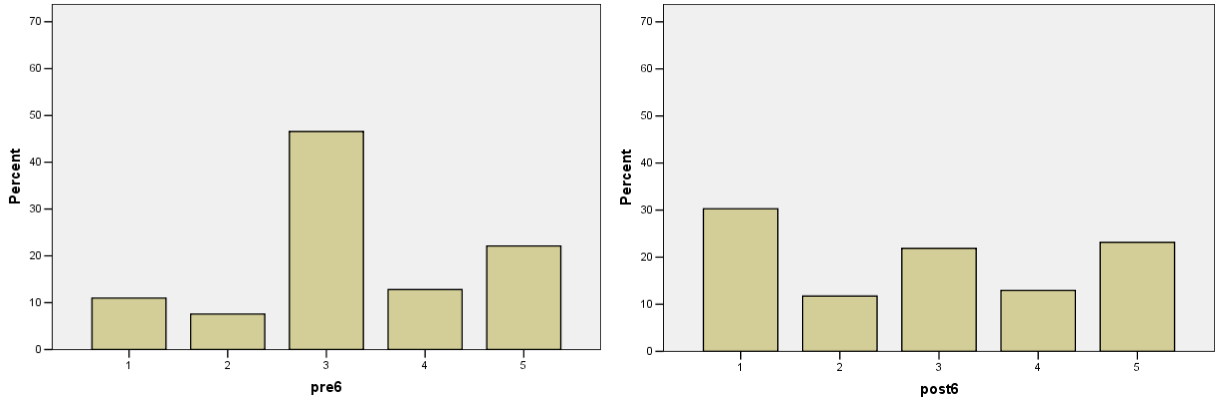
Item 4: It is best to put the money you save in your room at home.



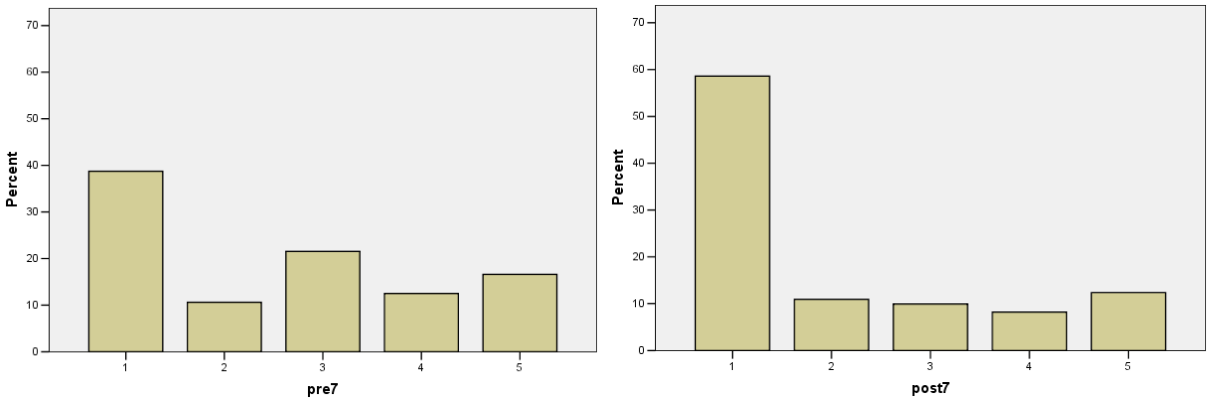
Item 5: It is important to save for the things that I want to buy in the future.



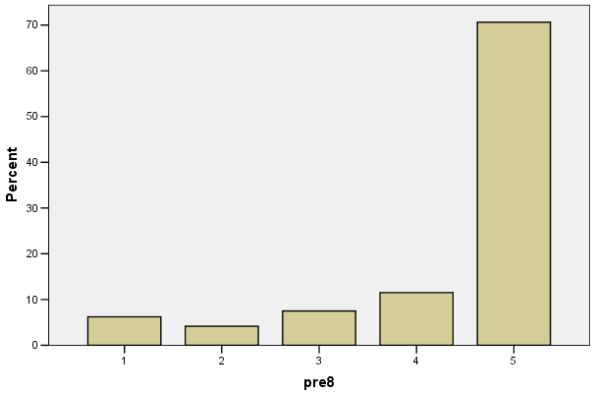
Item 6: When I invest in stocks, I will always make money and never lose money.

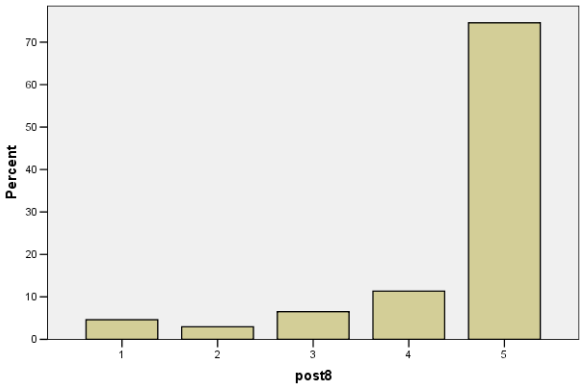


Item 7: I'm too young to need a long term goal for my money.

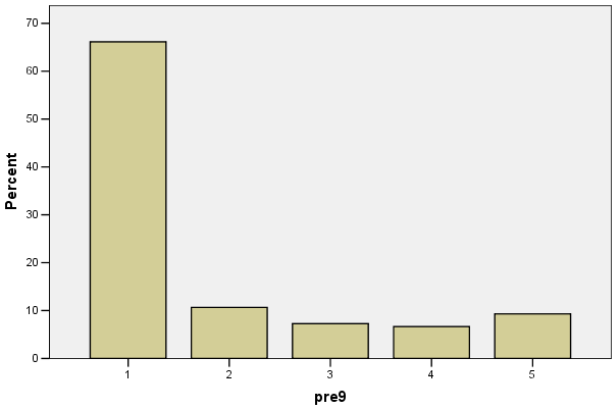


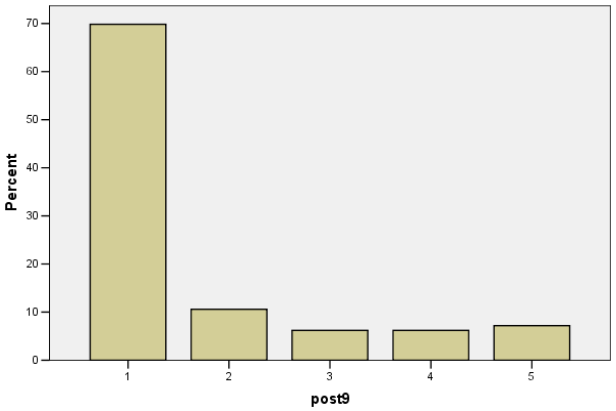
Item 8: It is important for families to keep money in real banks.



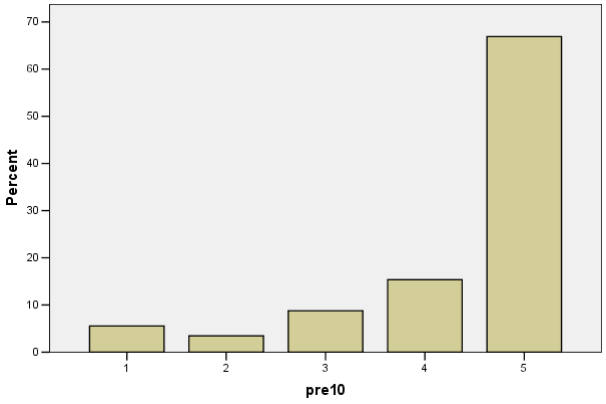


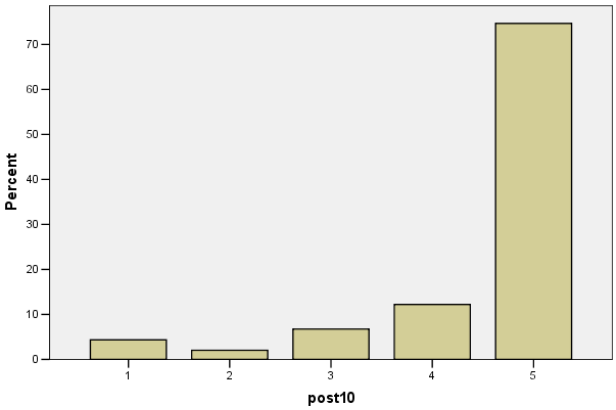
Item 9: I want to spend the money I earn right away.





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





Conclusions – see pages 1-2

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