



**Evaluative Report
Department of Financial Institutions Program
Washington State**

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Introduction

The purpose of this study was to 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 fall of 2006, 55 elementary school teachers and 1 middle school teacher in 32 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, Dr. Mark Schug of the Center for Economics Education at the University of Wisconsin – Milwaukee, developed survey (see Appendix A) measuring student beliefs about savings habits, handling money, the role of business, etc. 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). This survey was given to the Washington students before receiving their Money Savvy Pigs and after they had completed their training. This report presents the analysis and interpretation of the results of those surveys.

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 samples data for the 2nd and 3rd grader students indicates statistically significant improvements on eight out of ten items. One of the effect sizes was medium on an important item (#6 indicating more disagreement with keeping money at home). The remainder of the statistically significant changes had small effect sizes, but the students began with fairly good responses to items 1, 2, 3, 4, and 8 (see Table 3), so this is not something to be concerned with. In addition, as many of the positive attitudes towards saving money and making donations, are counter-popular culture, reinforcing them is certainly warranted. Student responses to items 7 and 10 also changed from pre to post with only a small effect size. Students, did not however,

begin with a proper understanding. For item 7 (investing in stocks always produces profits) 51% of the students admitted to being unsure on the pre-test. While roughly a quarter of the students remained unsure, roughly a quarter became sure of the correct response – you do not always make money in the stock market. For item 10 (donating money helps others but not me), only 41% disagreed with this on the pre-test (with 24% unsure and 35% agreeing). While only 16.7% more disagreed on the post-test, this did put the percentage of those disagreeing to well over half (57%).

The small, but non-significant change in the wrong direction on Item 9 (importance of families keeping money in banks), is also of little concern, first, because on average, the majority of students agreed with this statement and second, the change being non-significant implies the difference could have occurred by random error.

The aggregate data for the combination 4th, 5th, 7th and 8th grade participants, also indicated program effectiveness. The paired sample data indicated six, statistically significant improvements in student attitudes or knowledge. The change in students' general self-perception of their money handling ability was a medium sized effect. While the effect sizes of the remaining changes (items 2, 6, 7, 8, and 10) were small, the initial responses to items 2, 8 and 10 were fairly on target. Students responded to item 6 (it is best to keep your money in a room at home) on the pre-test with roughly equal amounts agreeing and disagreeing (36%) and about 27% unsure. This changed to almost 60% disagreeing, as they should. Student responses to item 7 (always making profit on stocks) improved with almost 20% more disagreeing with this and roughly 17% less unsure.

The small, and not statistically significant change in response to item 5 (the thing I enjoy most about earning money is getting to spend it later on) is not of concern for two reasons: 1) it is not statistically significant – hence likely to have occurred by chance, 2) the item is a bit confusing: waiting till later can be perceived as a positive, but spending at all (versus saving) can be perceived as a negative.

In this evaluator's professional opinion, these data indicate that the Money Savvy Kids™ curriculum worked effectively for both groups of students who participated in this study from Washington State.

Overall, these results are consistent with those found in previous studies in both urban and suburban Chicago, in Cleveland, Ohio, in Washington State, and in North Dakota. What each of these studies suggests is that the Money Savvy Kids™ curriculum is effective with a wide variety of English reading students.

Methodology

The 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 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 Lilliefors 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.

Because collected pre and post-surveys include a significant number that cannot be matched (probably due to students missing class on a particular day), an independent samples analysis of all the pre-tests compared to all the post-tests, will be done as well. If the data are normal, an independent samples t-test will be used. If not, a Mann-Whitney U test will be used.

(Test and survey data can often deviate from the normal distribution due to floor effects on pre-tests and ceiling effects on post-tests. Another factor which can cause deviations from normality are outliers – test scores that are very low or very high. There are two general approaches to dealing with non-normality: data cleaning and transforming or using non-parametric statistics. Data cleaning includes removing outliers. Data transformations involve mathematical transformations of data, such as taking the logarithms of the data, and if this generates a normal distribution, doing statistical tests on the transformed scores. This evaluator prefers to accept the data as they are and use the appropriate non-parametric tests as needed.)

Any statistically significant changes from pre to post, using whatever method, 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 not 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 1/10th of a standard deviation. This effect size is considered “small,” even though the likelihood that such a change occurred by chance is very unlikely.

Finally, 1031 students who completed either pretests, posttests or both were from the 2nd and 3rd grades. A smaller subset of 223 students were in either 4th, 5th, 7th, or 8th grade. Because of the early elementary focus of the Money Savvy KidsTM curriculum, all analyses were conducted on these two separate groups, and a comparative analysis was made between the two groups.

Results for 2nd and 3rd Grades

Matched Tests: Mean Item Changes

Five hundred and twelve 2nd and 3rd grade students could be identified by name and completed both the pre and post-tests. The average scores and standard deviations for each item are given in Table 1. When the sample size (“N”) is less than 512 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 for 2nd and 3rd grade students.

	N	Pre	SD	Post	SD	Desired change/achieved
Item 1	512	2.64	.559	2.80	.470	Increase, yes
Item 2	504	1.44	.715	1.26	.565	Decrease, yes
Item 3	506	1.43	.712	1.26	.604	Decrease, yes
Item 4	508	2.58	.696	2.79	.516	Increase, yes
Item 5	511	2.39	.803	2.48	.774	Slight increase, no?
Item 6	510	2.45	.810	2.01	.913	Decrease, yes
Item 7	510	2.05	.704	1.70	.811	Decrease, yes
Item 8	510	2.64	.563	2.79	.483	Increase, yes
Item 9	506	2.80	.498	2.76	.545	Slight decrease, no
Item 10	509	1.95	.870	1.70	.873	Decrease, yes

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

Item	Z value	Exact 2-tailed significance	Effect size	Described Effect Size
1. I know a lot about how to handle my money.	-5.058	0.000	0.26	Small
2. Saving money is greedy.	-4.958	0.000	-0.28	Small
3. It is important to have the things I want when I want them.	-4.702	0.000	-0.26	Small
4. I believe it is important to save money for the things that I want to buy in the future.	-5.560	0.000	0.34	Small
6. It is best to put the money you save in your room at home.	-8.909	0.000	-0.56	Medium
7. When I invest in stocks, I will always make money and never lose money.	-8.156	0.000	-0.46	Small
8. Business people help others by providing them with goods and services.	-5.150	0.000	0.29	Small
10. When I donate money it helps others but doesn't help me.	-5.176	0.000	-0.29	Small

What Tables 1 and 2 tell us about student responses to individual items.

In general these two tables show that there were statistically significant improvements in student understanding on 8 of the 10 items on the assessment. The changes from pre to post on two of the items that did not change with statistical significance changed in the wrong direction, but bear in mind – not being statistically significant implies that this change could very likely have occurred completely by chance. The individual item changes are described below in terms of averages based on the rating scale: 3 indicating agreement, 2 uncertainty, and 1 disagreement. Following these written descriptions is a table showing how student responses changed from pre to post in terms of percentages.

The average response of the students to item 1 changed from 2.64, leaning towards agreement to 2.80, more strongly agreeing. This indicates an improvement in student self-confidence regarding the proper handling of money. The two-tailed exact significance implies that this improvement in average score could only have occurred by chance less than 1 in 1000 times. The .26 effect size indicates that this improvement is roughly one quarter of an average standard deviation in size. Cohen considers this a “small effect.”

The average response of the students to item 2 changed from 1.44, leaning towards disagreeing, to 1.26, which is more strongly disagreeing. This indicates an improvement in student understanding, because it is appropriate for students to disagree with the notion that saving money is selfish. The two-tailed exact significance implies that this improvement in average score could only have occurred by chance less than 1 in 1000 times. The -.28 effect size indicates that this improvement is roughly 28% an average standard deviation in size. Cohen considers this a “small effect.” The minus sign indicates that the average score decreased from pre to post (which is appropriate for this item).

The average response of the students to item 3 changed from 1.43, leaning towards disagreeing, to 1.26, which is more strongly disagreeing. This indicates an improvement in student understanding, because it is appropriate for students to disagree with the notion that saving money is selfish. The two-tailed exact significance implies that this improvement in average score could only have occurred by chance less than 1 in 1000 times. The -.26 effect size indicates that this improvement is just over one quarter of an average standard deviation in size. Cohen considers this a “small effect.” The minus sign indicates that the average score decreased from pre to post (which is appropriate for this item).

The average response of the students to item 4 changed from 2.58, leaning towards agreeing, to 2.79, which leans even more towards strongly agreeing. This is an improvement of student understanding because it is appropriate for students to believe that saving money for future purchases is important. The two-tailed exact significance implies that this improvement in average score could only have occurred by chance less than 1 in 1000 times. The .34 effect size indicates that this improvement is 34% of an average standard deviation in size. Cohen considers this a “small effect.”

The average response of the students to item 6 changed from 2.45, on the agreeing side of unsure, to 2.01, 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 (saving money in your room is the best method of saving). 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 -0.56 effect size indicates that this decrease in score is roughly 56% of an average standard deviation in size. Cohen considers this a “medium effect.”

The average response of the students to item 7 changed from 2.05, very close to uncertain, to 1.70, which leans more towards disagreeing. This indicates an improvement in student learning because it is more appropriate for students to disagree with the idea that investing in the stock market always pays off. The two-tailed exact significance implies that this change in average score could only have occurred by chance less than 1 out of 1000 times. The $-.46$ effect size indicates that this improvement is almost one half of an average standard deviation in size. Cohen considers this a “small effect.”

The average response of the students to item 8 changed from 2.64, leaning towards agreeing, to 2.79, leaning even more towards agreeing. This indicates an improvement in student learning because it is more appropriate for students to agree with the idea that business people help others by providing goods and services. The two-tailed exact significance implies that this change in average score could only have occurred by chance less than 1 out of 1000 times. The $.29$ effect size indicates that this improvement is almost 30% of an average standard deviation in size. Cohen considers this a “small effect.”

The average response of the students to item 10 changed from 1.95, very close to uncertain, to 1.70, which leans towards disagreeing. This indicates an improvement in student understanding because more students should disagree that donating money only helps the recipient. The two-tailed exact significance implies that this change in average score could only have occurred by chance less than 1 out of 1000 times. The $-.29$ effect size indicates that this improvement is roughly 30% of an average standard deviation in size. Cohen considers this a “small effect.”

These interpretations, as well as the statistically non-significant changes are presented in terms of percentages of students picking each possible choice before and after being taught in Table 3.

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

Item	Response	% students pre-test	% students post-test	Comments
1	1 disagree 2 unsure 3 agree	4.1 27.8 68.1	2.9 14.6 82.5	Fairly large percentages believing they know how to handle money before and after participation. 13.2 % fewer unsure after. 14.4 % more students agreeing that they can properly handle money after participation.
2	1 disagree 2 unsure 3 agree	69.2 17.8 13.0	80.2 13.1 6.7	11 % more students disagreeing that saving is greedy. 4.7 % fewer unsure. 6.3 % fewer students agreeing that saving is greedy after participation.
3	1 disagree	70.1	82.2	Fairly large percentage disagreeing with immediate

	2 unsure 3 agree	16.9 13.0	9.2 8.6	gratification to begin with. 12.1 % more students disagreeing with immediate gratification, after instruction. 7.7 % fewer unsure. 4.4 % fewer agreeing with immediate gratification.
4	1 disagree 2 unsure 3 agree	12.0 17.7 70.3	4.9 11.3 83.9	7.1 % fewer students disagreeing after instruction that saving for future is important. 6.4% fewer unsure and 13.6% more agreeing.
5	1 disagree 2 unsure 3 agree	20.4 20.0 59.6	17.4 17.0 65.6	3 % fewer students disagreeing, 3.0 % fewer unsure, and 6 % more agreeing with the statement that what they enjoy most about earning money is getting to spend it later on.
6	1 disagree 2 unsure 3 agree	20.4 14.5 65.0	41.2 16.7 42.0	20.8 % more students disagreeing that you should keep money in your room at home. 2.2 % more unsure. 23 % fewer agreeing with this after participation.
7	1 disagree 2 unsure 3 agree	22.3 50.1 27.6	51.9 25.7 22.4	29.6 % more disagreeing that you always make money on stocks. 24.4% fewer unsure. 5.2 % fewer agreeing with this.
8	1 disagree 2 unsure 3 agree	4.3 27.5 68.2	3.3 14.5 82.2	1 % fewer disagreeing that business people help others with goods & services, although very few disagree with this before or after. 13 % fewer unsure. 14 % more students agree with this after participation.
9	1 disagree 2 unsure 3 agree	4.3 11.4 84.2	5.9 12.3 81.8	1.6 % more disagree that it is important for families to keep money in real banks, although a small percentage do so. .9 % more unsure and 2.4 % less agreeing. These changes, while counter the instructional goals, are not statistically significant. Importantly, over 80% of students agree with this item, as they should, both before and after.
10	1 disagree 2 unsure 3 agree	40.6 24.1 35.3	57.3 15.0 27.7	16.7 % more disagreeing that saving only helps the saving individual. 9.1 % fewer unsure. 7.6 % fewer agreeing.

Results for 4th, 5th, 7th & 8th Grades

Matched Tests: Mean Item Changes

One hundred and fifty-eight 4th, 5th, 7th & 8th grade students could be identified by name and completed both the pre and post-tests. The average scores and standard deviations for each item are given in Table 4. When the sample size (“N”) is less than 158 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 4. Descriptive statistics for paired samples data for 4th, 5th, 7th & 8th grade students.

	N	Pre	SD	Post	SD	Desired change/achieved
Item 1	155	2.57	.569	2.86	.402	Increase, yes
Item 2	156	1.22	.528	1.07	.324	Decrease, yes
Item 3	156	1.29	.614	1.21	.533	Slight decrease, yes
Item 4	156	2.83	.497	2.88	.359	Slight increase, yes
Item 5	155	2.41	.803	2.52	.759	Slight increase, no?
Item 6	152	1.99	.861	1.61	.799	Slight decrease, yes
Item 7	156	1.74	.726	1.53	.731	Decrease, yes
Item 8	158	2.50	.658	2.76	.485	Increase, yes
Item 9	153	2.78	.516	2.79	.509	Slight increase, yes
Item 10	153	1.75	.815	1.54	.827	Decrease, yes

Table 5. Significantly changed item response averages and effect size of changes.

Item	Z value	Exact 2-tailed significance	Effect size	Described Effect Size
1. I know a lot about how to handle my money.	-4.804	0	0.59	Medium
2. Saving money is greedy.	-3.432	0	-0.34	Small
6. It is best to put the money you save in your room at home.	-4.125	0	-0.46	Small
7. When I invest in stocks, I will always make money and never lose money.	-3.125	0.002	-0.29	Small
8. Business people help others by providing them with goods and services.	-3.666	0	0.45	Small
10. When I donate money it helps others but doesn't help me.	-2.329	0.02	-0.26	Small

What Tables 4 and 5 tell us about student responses to individual items.

In general these two tables show that there were statistically significant improvements in student understanding on 6 of the 10 items on the assessment. These are described subsequently in detail. The changes from pre to post on one of the items that did not change with statistical significance changed in the wrong direction, but bear in mind – not being statistically significant implies that this change could very likely have occurred completely by chance. The item changes are described below in terms of averages based on the rating scale: 3 indicating agreement, 2 uncertainty, and 1 disagreement. Following these written descriptions is a table showing how student responses changed from pre to post in terms of percentages.

The average response of the students to item 1 changed from 2.57, leaning towards agreement to 2.86, more strongly agreeing. This indicates an improvement in student self-confidence regarding the proper handling of money. The two-tailed exact significance implies that this improvement in average score could only have occurred by chance less than 1 in 1000 times. The .59 effect size indicates that this improvement is roughly 60% of an average standard deviation in size. Cohen considers this a “medium effect.”

The average response of the students to item 2 changed from 1.22, leaning towards disagreeing, to 1.07, which is more strongly disagreeing. This indicates an improvement in student understanding, because it is appropriate for students to disagree with the notion that saving money is selfish. The two-tailed exact significance implies that this improvement in average score could only have occurred by chance less than 1 in 1000 times. The -.34 effect size indicates that this improvement is roughly one third an average standard deviation in size. Cohen considers this a “small effect.” The minus sign indicates that the average score decreased from pre to post (which is appropriate for this item).

The average response of the students to item 6 changed from 1.99, very close, on average, to unsure, to 1.61, which is moving towards disagreeing. This actually indicates an improvement in student understanding, because the average dropping indicates more students disagreeing with this item. This is appropriate for this item (saving money in your room is the best method of saving). 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 -0.65 effect size indicates that this decrease in score is roughly 65% of an average standard deviation in size. Cohen considers this a “medium effect.” The minus sign indicates that the average score decreased from pre to post (which is appropriate for this item).

The average response of the students to item 7 changed from 1.74, on the disagreeing side of uncertain, to 1.53, which leans more towards disagreeing. This indicates an improvement in student learning because it is more appropriate for students to disagree with the idea that investing in the stock market always pays off. The two-tailed exact significance implies that this change in average score could only have occurred by chance less than 2 out of 1000 times. The -.29 effect size indicates that this improvement is roughly three-quarters of an average standard deviation in size. Cohen considers this a “medium effect.” The minus sign indicates that the average score decreased from pre to post (which is appropriate for this item).

The average response of the students to item 8 changed from 2.50, between agreeing and uncertain, to 2.76, leaning even more towards agreeing. This indicates an improvement in student learning because it is more appropriate for students to agree with the idea that business people help others by providing goods and services. The two-tailed exact significance implies that this change in average score could only have occurred by chance less than 1 out of 1000 times. The .45 effect size indicates that this improvement is 45% of an average standard deviation in size. Cohen considers this a “small effect.”

The average response of the students to item 10 changed from 1.75, on the disagreeing side of uncertain, to 1.54, which leans towards disagreeing. This indicates an improvement in student understanding because more students should disagree that donating money only helps the

recipient. The two-tailed exact significance implies that this change in average score could only have occurred by chance less than 2 out of 100 times. The $-.26$ effect size indicates that this improvement is roughly one quarter of an average standard deviation in size. Cohen considers this a “small.” The minus sign indicates that the average score decreased from pre to post (which is appropriate for this item).

These interpretations, as well as the statistically non-significant changes are presented in terms of percentages of students picking each possible choice before and after being taught in Table 3.

Table 6. Percentages of chosen responses to selected items on pre and post-measures.

Item	Response	% students pre-test	% students post-test	Comments
1	1 disagree 2 unsure 3 agree	3.8 34.6 61.5	1.9 10.3 87.7	Large percentage improvement in those believing they know how to handle money before and after participation: 26.2 % more after participation. 24.3 % fewer unsure after and 1.9% fewer disagreeing.
2	1 disagree 2 unsure 3 agree	82.7 12.2 5.1	94.9 3.2 1.9	12.2 % more students disagreeing that saving is greedy. 9 % fewer unsure. 3.2 % fewer students agreeing that saving is greedy after participation.
3	1 disagree 2 unsure 3 agree	78.8 12.8 8.3	84.6 9.6 5.8	Prior to instruction, the percentage of students disagreeing with immediate gratification is fairly high. After, 5.8 % more students disagreeing, 3.2 % fewer unsure & 2.6 % fewer agreeing.

4	1 disagree 2 unsure 3 agree	5.1 7.1 87.8	1.3 9.0 89.7	Many students appropriately agreed with this item both before and after. Nevertheless, there was a 3.8 % in disagreeing, with 1.9 % becoming unsure and 1.9 % more agreeing. Nevertheless, these changes were not statistically significant.
5	1 disagree 2 unsure 3 agree	19.9 19.2 60.9	16.1 15.5 68.4	3.8 % fewer students disagreeing, 3.7 % fewer unsure, and 7.5 % more agreeing with the statement that what they enjoy most about earning money is getting to spend it later on.
6	1 disagree 2 unsure 3 agree	37.0 26.6 36.4	58.4 20.8 20.8	21.4 % more students disagreeing that you should keep money in bedroom. 5.8 % less unsure. 15.6 % fewer agreeing with this after participation.
7	1 disagree 2 unsure 3 agree	42.3 41.0 16.7	61.5 24.4 14.1	19.2 % more disagreeing that you always make money on stocks. 16.7% fewer unsure. 2.6 % fewer agreeing with this.
8	1 disagree 2 unsure 3 agree	9.0 31.4 59.6	2.6 18.7 78.7	6.4 % fewer disagreeing that business people help others with goods & services. 12.7 % fewer unsure. 19.1 % more students agree with this after participation.
9	1 disagree 2 unsure 3 agree	4.5 12.9 82.6	4.5 11.7 83.8	There was very little change in this item at any level, and the students largely agreed with the idea of keeping money in banks.
10	1 disagree 2 unsure 3 agree	48.7 27.3 24.0	67.1 11.0 21.9	18.4 % more disagreeing that saving only helps the saving individual. 16.3 % fewer unsure. 2.1 % fewer agreeing.

References

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