Achievement Differences In Selective And Non-Selective Schools: An Exploratory Study Of S1 (Former Group B) Secondary Schools In Masvingo Urban Area, Zimbabwe

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ABSTRACT

The purpose of the study is to determine the effects of selective and non-selective secondary schools on academic achievement of students in Masvingo, Zimbabwe. An explanatory sequential design was opted in this study. A Wide Range Achievement test L2 revised-mathematics sub-test was used to measure students' achievement levels. Two secondary schools in the same catchment area (S1) and form one classes were purposely selected. Ndama is selective while Muchini is not, at form one level. Two classes from each school participated, giving a sample size of 131 students (F=66, M=65). 16 teachers from Ndama School volunteered to participate in the study. The results show that students at Muchini school got lower scores (M=30.64, SD=5.72), than those at Ndama school (M=36.37, SD=3.87), t (129) = 38.83, p < 0.01, two tailed. The size of this effect is large (effect size r = 0.96). Students at Ndama School, in class $1A^5$ got lower scores (M=33.75, SD=2.86) than did those in class $1A^1$ (M=38.91, SD=2.86), t (65) = -7.38, p < 0.05, two tailed. The size of this effect is large (effect size r= 0.67). A significant main effect for school, in which Ndama school (M=36.37) is achieving better than Muchini (M=30.64), F (1, 127) = 46.05, p < 0.01. The effect size for school is quite large (effect size r = 0.60). Teachers at Ndama School generally agreed that that high achieving pupils benefit from learning with similar peers.

Keywords: selective, streaming, achievement, mixed ability, homogenous.

1. INTRODUCTION

The grouping of pupils is only one of several factors affecting the learning environment of the classroom (Ireson and Hallam, 1999). The quality of instruction and the curriculum are central (Creemers, 1994). Both may mediate the effects of pupil grouping (Gamoran, 1986). The rationale for ability grouping is to deal with students' differences in knowledge, skills, developmental stage and rate of learning (Slavin, 1988) so that the teacher can tailor instruction according to level of students. However, in highly heterogeneous classes, teachers will have difficulties in optimizing instruction for all students, thus a lesson might be too easy for some and too difficult for others. The focus of this study is on comparing achievement differences in streamed (selective) and non-streamed (non-selective) secondary (S1) schools located in the same catchment area. Former group B (S1) secondary schools are located in urban African residential areas (high-density similar to inner-city areas in the United States) and are low fee paying with an average quality of education (Nkoma and Mapfumo, 2013; Nkoma, 2013).

Ability- grouped class assignment or between classes grouping (referred to as streaming in Zimbabwe) is a whole school program where students are assigned to a self contained class on the basis of ability or achievement, however students rarely move from lower to upper streams (Nkoma, 2013). The lead researcher has been an educational psychologist in the Ministry of Education and has noted that upon entry at form one,

most streaming secondary schools use students Zimbabwe Schools Examinations Council (Zimsec) grade seven results to place students in either high, middle or low streams, while non-streaming schools (mixed ability) place students in classes on first come basis regardless of results. The number of units a candidate accumulates from all the four subjects (Mathematics, English, General paper, Shona or Ndebele) is indicative of performance (Nkoma, Mapfumo and Mashavira, 2013). Pupils who score fewer units are regarded as better performers than those with more units (Kanyongo, 2005). Hence, those with fewer points are allocated to upper streams and those with more points are put in lower stream classes.

Controversy concerning ability grouping is centered on rationality versus egalitarian ideals (Gameron et al., 1995). According to Mamary and Rowe (1985), the advocators of grouping students by ability (rationality ideal) propose that;

- The teacher becomes more efficient in planning when pupils are grouped
- High ability students learn more than low ability ones
- Low ability students do not get frustrated by the progress of high ability students
- It is easier to teach and hence less discipline problems occur in homogeneous classes

Thus, their argument is that it allows high achievers to move rapidly while low achievers are given attainable goals and extra help.

On the other hand, the egalitarian persuasion (Slavin and Braddock, 1993) argues that:

- Low ability groups are exposed to substantially less material and low quality of instruction than students in middle and upper streams.
- Low ability achieving students develop feelings of inferiority and worthlessness and hence,
- Are more likely to drop out of school

Teachers have low expectations of lower stream classes (Chisaka, 2002; Chisaka and Vakalisa, 2003; Gameron et al., 1995) or may lead to the creation of academic elites for upper stream classes (Persell, 1977; Oakes, 1985). The policy of ability grouping serves to reproduce class differences and suppresses mobility between high and low ability students (Lou et al., 2000).

The effect of ability grouping on pupil achievement has been a subject of debate for many years (Ireson., et al 1999) indicating mixed findings for the effects on academic achievement. Studies investigating the impact of selective and non-selective school systems on pupil achievement found minimal differences in terms of learning outcomes on standardized reading and mathematical tests and examination performance (Gray *et al.*, 1983; Marks *et al.*, 1983; Steedman, 1980, 1983), while others have found that pupils' performance becomes increasingly differentiated depending on the kind of school they are in (Lughart *et al.*, 1989). In a selective grammar school pupils in the top group had higher levels of achievement than those in the lower group

(Lacey, 1970 cited by Ireson et al., 1999), however with the introduction of mixed ability grouping, Lacey, (1974 cited by Ireson et al, 1999) in a follow-up study, found that the most able pupils attainment was unaffected by the change where as the attainment of less able students improved. Ireson and Hallam, (1999) found that pupils of average ability seem to perform better in high ability schools than comparable students in schools where the majority of the students are of lower ability.

Lower stream classes loose a great deal of ground while those in upper streams increased their performance level beyond that exhibited by comparative students in heterogeneous classes in selective secondary schools, with schools with a three group system producing greater spread of test gains (Kerckhoff, 1986). However, Newbold (1977) found no difference in overall achievement, but greater spread of scores in the streaming sample. Reviews and meta-analyses on the effects of ability grouping on achievement found few significant effects (Kulik & Kulik, 1992; Slavin, 1990), and when groups proceed at the same pace and cover the same curriculum, there is little difference in learning outcomes (Hallam & Toutounji, 1996). In their research on tracking in secondary schools, Kulik and Kulik (1982, 1992) found the largest effects in programs designed for gifted and talented students wherein enrichment programs and accelerated classes involve greatest curriculum adjustment.

The disadvantages of ability grouping lie mainly in its impact on non-academic outcomes and on the opportunity to learn (Ireson., et al 1999). Students in bottom streams tend to be labeled and stereotyped by teachers (Ball, 1981; Schwartz, 1981; Burgess, 1983) and hence have lower self-esteem and negative attitudes towards school and schoolwork (Oakes, 1985; Gamoran and Berends, 1987), while upper stream students tend to have higher educational aspirations and more positive academic and personal concepts (Oakes, 1985). Similarly, in Zimbabwe, studies have found that low ability students receive differential treatment from teachers and are stereotyped, bullied and labeled by other students and teachers (Chisaka, 2002; Chisaka and Vakalisa, 2003; Matavire et al., 2012). However, Kulik and Kulik (1992) found no overall effect of ability grouping on self-esteem but ability grouping tended to raise the self-esteem scores of lower aptitude students and reduce the self-esteem of higher aptitude students.

In schools that stream, research indicates that teachers prefer teaching high ability groups (Findlay and Bryan, 1975; Ball, 1981; Finley, 1984). Several researchers have suggested that teachers avoid teaching the low streams because of pupils' negative attitudes towards school and poor behavior in the classroom (Schwartz, 1981; Finley, 1984; Taylor, 1993). However, teachers indicate positive attitudes towards teaching homogenous classes (Wilson and Schmidts, 1978; Guttman *et al.*, 1972).

Literature shows that instruction in lower ability groups is of different quality to that provided for high ability groups (Chisaka and Vakalisa, 2003; Evertson, 1982; Oakes, 1985; Gamoran, 1986). Higher ability classes receive instruction that is more analytic and requiring critical thinking on tasks (Oakes, 1985) while pupils in

low streams tend to concentrate on basic skills, work sheets and repetition with fewer opportunities for independent learning, discussion and activities that promote critique, analysis and creativity (Burgess, 1983; Oakes, 1985; Page, 1992). Schwartz (1981) also found that when high track students gave incorrect answers, teachers coaxed them to develop correct answers, while low track students who were incorrect were ignored. In mixed ability classrooms, whole-class teaching predominates and there is little evidence of genuine mixed-ability group work. The cognitive demands made on students tend to be low, as are the cognitive levels of verbal transactions between pupils (Kerry, 1982b, 1982c; Sands & Kerry, 1982; Kerry & Sands, 1984).

2.   STATEMENT OF PROBLEM

This research study is tailored to investigate the effects of selective and no-selective schools on students' achievement in Masvingo urban, Zimbabwe.

3.   PURPOSE OF STUDY

The purpose of the study is to determine if there are any achievement differences in selective and on-selective secondary schools located in the same catchment area in Masvingo urban and more specifically on effects of streaming on academic achievement. The second phase of the research aimed at determining teachers' perception on streaming in a selective school.

3.1 HYPOTHESES
–   There are no achievement differences between Muchini (non-selective) and Ndama (selective) secondary schools
–   There are no significant differences in achievement between upper and lower stream form one classes at Ndarama secondary
–   There are no significant differences in achievement by school and gender

3.2 RESEARCH QUESTIONS
–   What are the teachers' views on streaming in a streaming school?
–   What are head-teachers and heads of mathematics department views on school performance in their respective schools

4.   RESEARCH METHODOLOGY

4.1 RESEARCH DESIGN
An explanatory sequential design was opted in this study as quantitative analysis of students achievement were followed by qualitative analysis of teachers responses to structured questionnaire and in-depth interviews of head-teachers and head of department of mathematics. In-depth interviews were done with

head-teachers and head of department for mathematics, while teachers had to respond to structured interview questions. This design is based on the strength of both quantitative and qualitative research methods.

4.2 SAMPLE AND SAMPLING METHOD

Two secondary schools located in the same catchment area (S1) and form one classes were purposely selected. One school streams (Ndamba) while the other does not (Muchini) at form one level. Two classes at Ndama School, the upper stream class ($1A^1$) and lower stream ($1A^5$) were purposely selected while students in both schools were randomly selected. Two classes at Muchini School participated in the study. A total sample size of 131 students (F=66, M=65) participated in the study. Ndama had a total of 67students (F=33, M=34), while Muchini had 64 students (F=33, M=31). The mean age of students was 13. A total of 16 teachers from Ndama School volunteered to participate in the study while two head-teachers and two heads mathematics of department were interviewed.

4.3 INSTRUMENTS AND DATA ANALYSIS

A Wide Range Achievement Test-Revised Level 2 (Jastak, Wilkinson and Wilkinson, 1984) - mathematics subtest was used to determine students achievement levels. The test is used by Schools psychological services in the Ministry of Education in assessments. The questions are structured from simple (2+7=) to complex ($2x^2 – 36x = 162$). This was followed by a structured questionnaire for teachers with 13 questions in the form of a five point likert scale which was designed from the literature. This instrument was given to four experts in the field for screening and evaluation and content validity was affirmed. A pilot study was done to twelve teachers and the Pearson correlation coefficient was 0.71 and hence considered good enough for this research

A t-test was used to compare differences in achievement within and between schools. A two way analysis of variance was used to identify differences between samples means representing the independent effects of variables school (A) and gender (B). A chi-square test was used to determine the degree of association of teachers' perceptions on streaming.

4.4 PROCEDURE

Permission was granted to do the research by District Education Officer and the researchers went on exploratory observations of the schools and classrooms and had informal interviews with the head-teachers to clarify the purpose of the research. Both the schools are located in the same catchment area and are headed by female head-teachers and they practice 'hot-seating' which means there are double sessions each day (morning and afternoon) and the class sizes for form ones are approximately sixty. A mixed ability secondary school, Muchini, enrolls form one students into classes on first come basis regardless of grade seven results. The streaming school, Ndama, only took students this year (2014) having between four and sixteen points. Those with between four and six points were put in the upper class while those with between fifteen and sixteen points were put in lower class. General observations of classroom arrangements were similar for both

schools, with students seating in rows of pairs. Sixteen teachers from Ndama School volunteered to participate in the study. Students who volunteered to participate were randomly selected in each of the two classes from each school.

5. RESULTS AND DISCUSSION

The first hypothesis states that there are no significant differences in achievement between the schools

Table 1: Mean and standard scores for Ndama and Muchini Schools

School name	n	Mean	SD	t-value	df	sig
Muchini	64	30.64	5.72	-38.83	129	***
Ndama	67	36.37	3.87			

**significant at 0.01

Table 1 above indicates that students at Muchini school had lower scores (M=30.64, SD=5.72) than those at Ndama school (M=36.37, SD=3.87), t (129) = -38.83, p< 0.01, two tailed. The size of this effect is large (effect size r = 0.96), as is the degree of association between the independent variable and the dependant measure (estimated omega squared=0.92). That is, approximately 96% of the variance in test scores (dependant measure) is accounted for by school name (independent variable).   These results are in tandem with Lughart *et al.*, (1989) and Galindo-Rueda and Vignoles (2004) who found that selective school system did better than mixed ability schools. Pupils of average ability seem to perform better in high ability schools than comparable students in schools where the majority are pupils of lower ability (Ireson and Hallam, 1999) and because of the large mixed ability classes which are highly heterogeneous, teachers may have difficulties in optimizing instruction for all students, thus a lesson might be too easy for some and too difficult for others, thus diluting the academic curriculum in an effort to teach a wide range of students.

The second hypothesis states that there are no significant differences in achievement between upper and lower classes in Ndarama School.

Table 2: Achievement differences between upper ($1A^1$) and lower ($1A^5$) at Ndama school

Class	n	Mean	SD	t-value	df	Significance
$1A^1$	34	38.91	2.86	7.38	65	0.01***
$1A^5$	33	33.75	2.86			

***Significant

Table 3 indicates that students in class $1A^1$ got higher scores (M=38.91, SD=2.86) than did those in class $1A^5$ (M=33.75, SD=2.86), t (65) = 7.38, p< 0.05, two tailed. The size of this effect is large (effect size r= 0.67) as was the degree of association between the independent variable and the dependant measure (estimated - omega squared = 0.45). Students in high ability groups' gain in academic performance and those in low ability groups lose in performance (Hallinan and Sorensen, 1983; Kerckhoff, 1986).

Literature shows that instruction in lower ability groups is of different quality to that provided for high ability groups (Evertson, 1982; Oakes, 1985; Gamoran, 1986). Higher ability classes receive instruction that is more analytic and requiring critical thinking on tasks (Hargreaves, 1967; Oakes, 1985) while pupils in low streams tend to concentrate on basic skills, work sheets and repetition with fewer opportunities for independent learning, discussion and activities that promote critique, analysis and creativity (Hargreaves, 1967; Burgess, 1983; Oakes, 1985; Page, 1992).

The third hypothesis states that there are no significant differences in achievement by school (A) and gender (B).

Table 3: A two way ANOVA table for school, gender and achievement data

Source	Sum of Squares	df	Mean Square	F ratio	p
Between groups					
Factor A (school)	1075.65	1	1075.65	46.05	0.01***
Factor B (gender)	15.07	1	15.07	0.65	0.05
A×B (School × gender)	12.28	1	12.28	0.53	0.05
Within groups	23.36	127	0.18		
Total	121.36	131	2318.90		

***Statistically significant effect

Table 4: Achievement as function of school and gender

School		Gender		
		Female	Male	M
Ndama	M	36.58	36.18	36.37
	SD	(3.78)	(3.97)	
Muchini	M	31.24	30.00	30.64
	SD	(5.76)	(5.71)	
M		33.90	33.23	

Tables 3 and 4 indicate a significant main effect for school, in which that Ndama school (M=36.37) is achieving better than Muchini (M=30.64), F (1, 127) = 46.05, p < 0.01. The main effect for gender was not significant F (1, 127) = 0.65, p > 0.05. There was no interaction between these factors, however, F (1, 127) = 0.53, p = ns). The effect size for school is quite large (f = 0.60). The degree of association between achievement and school is quite strong (estimated – omega squared = 0.26). However, Kulik and Kulik (1990), in his best evidence synthesis on between-class grouping in secondary schools found none of the grouping plans has an effect on performance but grouping may have effects with regard to: teacher approach to instruction, pupil access to resources and curriculum, and pupil behavior and attitudes (Hallam &

Toutounji, 1996). The results also indicate no gender differences in achievement across schools and these are similar to findings by Nkoma et al., (2012); Springler and Alsup,(2003).

The first research question seeks to find teachers views on streaming at Ndama School

Table 5: Teachers' perceptions on streaming

Item		response					chi-square test χ^2
		Strongly agree	Agree	neutral	disagree	strongly disagree	
1.	High teacher-pupil ratio impact negatively on teaching	7 (70%)	2 (20%)	1 (10%)	0 (0%)	0 (0%)	$\chi^2(4) = 17$ ***
2.	High achieving students benefit from working with similar peers	5 (50%)	5 (50%)	0 (0%)	0 (0%)	0 (0%)	$\chi^2 (4) = 15$ ***
3.	Lower achieving pupils benefit from working with high achieving pupils	2 (20%)	4 (40%)	3 (30%)	1 (10%)	0 (0%)	$\chi^2 (4) = 5.5$
4.	Low achieving pupils in low stream class develop lower self-esteem	1 (10%)	4 (40%)	3 (30%)	2 (20%)	0 (0%)	$\chi^2 (4) = 5$
5.	Academic standards improve with streaming in schools	0 (0%)	9(90%)	1 (10%)	0 (0%)	0 (0%)	$\chi^2 (4) = 34$***
6.	Morale for high and middle stream Teachers' is high	2 (20%)	4 (40%)	4 (40%)	0 (0%)	0 (0%)	$\chi^2 (4) = 8$
7.	Morale is low in low stream teachers	1 (10%)	6 (60%)	2 (20%)	1 (10%)	0 (0%)	$\chi^2 (4) = 12$**
8.	The least experienced teachers are assigned to low stream classes	0 (0%)	2 (20%)	2 (20%)	6 (60%)	0 (0%)	$\chi^2 (4) = 12$**
9.	The highly experienced teachers are are assigned to upper stream classes	2 (20%)	0 (0%)	2 (20%)	5 (50%)	1 (10%)	$\chi^2 (4) = 8$
10.	Teacher expectation/instruction differ according to the level of stream	1 (10%)	8 (80%)	1 (10%)	0 (0%)	0 (0%)	$\chi^2 (4) = 25$***
11.	Teachers provide different content/activities depending on whether they are in the low, Middle or high stream	1 (10%)	6 (60%)	1 (10%)	2 (20%)	0 (0%)	$\chi^2 (4) = 13$**
12.	Generally classroom instruction is designed for the average learner in class	0 (0%)	7 (70%)	1(10%)	2 (20%)	0 (0%)	$\chi^2 (4) = 18$***
13.	Pupils move up and down streams depending on performance	2 (20%)	2 (20%)	3 (30%)	2 (20%)	1 (10%)	$\chi^2 (4) = 3$

*** significant at 0.05; *** significant at 0.01 (two -tailed)*

A chi-square test for goodness-of-fit reveal that the observed data departed from the expectation of no difference across the categories, $\chi^2 (4) = 17$, $p < 0.01$ (two-tailed). Interviews with head-teacher and head of department for mathematics indicated that the average class size is 60. Thus, the teachers generally felt that high teacher-pupil ratio impact negatively on teaching and learning. Studies have demonstrated the positive eefects of small classes on average student achievement for all students (for example, Finn and Achilles, 1990; Kruger, 1999), while, Hoxby (2000) showed that class size does not have a statistically significant

effect on student achievement. Shapson, Wright, Eason, & Fitzgerald, (1980) reported modest differences between classes of varied sizes.

Teachers generally agreed that that high achieving pupils benefit from learning with similar peers, χ^2 (4) =15, p < 0.01 (two-tailed) and teachers agreed that low achieving students do not benefit from high achieving students. Gamoran (1992) reviewed evidence suggesting that higher-track teachers were more enthusiastic and took more time preparing lessons, while teachers in low-track classes, spent less time on instruction and more on behavior management.

Teachers agreed that academic standards improve with streaming, χ^2 (4) = 34, p < 0.01 and that morale is low for low stream teachers, χ^2 (4) = 12, p < 0.05. They also agreed that their expectations differ depending on level of the stream, χ^2 (4) = 12, p < 0.01. The disadvantages of ability grouping lie mainly in its impact on non-academic outcomes and on the opportunity to learn (Ireson., et al 1999). Students in bottom streams tend to be labeled and stereotyped by teachers (Ball, 1981; Schwartz, 1981; Burgess, 1983) and hence have lower self-esteem and negative attitudes towards school and schoolwork (Oakes, 1985; Gamoran and Berends, 1987), while upper stream students tend to have higher educational aspirations and more positive academic and personal concepts (Oakes, 1985).

There was general agreement that the least experienced teachers are assigned to low stream classes, χ^2 (4) = 12, p < 0.05nad in contrast there was no agreement that highly experienced teachers are assigned to upper stream classes, χ^2 (4) = 8, p > 0.05. However, the head-teacher and head of department commented that teachers rotate after a four year cycle. That is, teachers assigned to teach upper stream class will see them through to form 4 from form one level and then will be allocated low stream class at form one. This is done for every class. This is in contrast to the findings by Sukhnandan & Lee, (1998) that higher sets were more likely to have experienced and highly qualified teachers.

The chi-square test indicated that the teachers were in general agreement to modifying instruction depending on the stream they teach, χ^2 (4) = 13, p < 0.05 and that instruction is designed for the average learner in class, χ^2 (4) = 18, p < 0.01. Chisaka,and Vakalisa,(2003) found that teachers do not prepare thoroughly for low ability classes and that teachers in high ability classes view their students as intelligent enough to learn own their own. This is analogous to whole class instruction which is characterized by using textbook-dominated curriculum (Reis et al., 1993) and movement through the curriculum is at the same pace using the same methods and materials (Goodlad, 1984) and instruction for the whole class at the same time (Good and Brophy, 1984). Thus the teacher makes virtually all of the choices in the classroom, including what questions to ask and which to answer and textbooks are the most common medium for teaching and learning. Such classroom characteristics can be viewed as teacher centered (Cuban, 1984). There are, however, individual

differences among students' grouped together for instruction (Boaler, 1997), however teachers of these classes have been found to treat the entire class as being of exactly the same achievement level. Maybe teachers do not know how to adjust curriculum for high and low ability students (Nkoma, 2014)

The chi-square test for goodness of fit did not show any variation from the expectation of no difference across the categories in: 1. Lower achieving students benefit from learning with higher achieving students, 2. Low achieving students in low stream classes develop low self-esteem, 3. Moral for high and middle class teachers is high. These perceptions are contrast to research findings (Nkoma, 2014; Chisaka and Vikalisa, 2003; Nkoma, 2013) but in agreement that students rarely move up and down steams depending on achievement.

The second research question seeks views of head-teachers and heads of mathematics department on school performance in their respective schools

In-depth interviews with head-teachers and heads of mathematics department indicated that at Ndama School the school achieved 9th position in Masvingo province and 99th nationally at ordinary level last year, 2013. The head-teacher indicated that she sets the standards for each class at the beginning of the year which is agreed upon by teachers. The target is based on previous year's results. Failure to reach a target (pass mark) will result in what the head of department called 'kuseri kwe-desk' when literally translated it means 'behind the desk' where teachers are questioned on how they failed to meet or exceed a target. The head-teacher said that teachers are generally afraid of this and hence work hard to achieve goals. Unlike at Muchini School where results are on a gradual rise from previous years, the problem of failure was generally attributed to child and family. The Ndama school head-teacher monitors all students' progress in tests by putting a school stamp and calling individual students who are regressing in performance. However, the head-teacher at Muchini School, only supervises teachers at pre-determined times, while supervision at Ndama School is only done by Heads of department. The rotation of teachers to different streams was agreed on by teachers and there are performance rewards for all teachers who exceed the benchmark in their classes (subjects), while at Muchini School all teachers are rewarded for exceeding previous year's overall pass rates. At this school, the head-teacher said that they thrive make the school child-friendly but is not quite sure what it actually means.

6. CONCLUSION

It appears that head-teacher's indirect supervision played a central role in students' achievement at Ndama School where the effect size was very large when compared to Muchini School. However, streaming has its effects as shown by the large effect size between lower stream and upper stream classes at Ndama School though the teachers generally agreed that streaming improves performance. Grouping arrangements are needed that enable pupils of all abilities to make maximum progress without increasing alienation and disaffection. According to Gameron, (2002) mixed ability teaching produces less inequality, but high-

achieving students tend not to progress as far as when they are assigned to high sets unless schools ensure that the highest performance standards are asked of them. Streaming is more rigid and far-reaching and hence exacerbates inequality, while setting is more flexible and linked to subject matter.

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