

Secondary Agriculture Enrollment and FFA Participation as Predictors of Collegiate Academic Success and Retention

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Abstract

Limited research, if any, has been conducted which documents the suggested value of secondary agriculture programs and participation in the National FFA Organization. To that end, the purpose of this study was to explore the suggested value in relationship to student performance and retention in college. The study sought to determine if students who had been enrolled in a secondary agriculture program had greater academic performance during the first year of college. In addition, the study investigated whether a relationship existed between the level of student involvement in a secondary agriculture program and academic performance. Finally, the existence of a relationship between secondary agriculture enrollment and retention in college was examined. The population for this study consisted of two groups of entering college freshmen (1998 and 2003) at the University of Missouri-Columbia. Findings revealed that enrollment in secondary agriculture did not produce greater academic performance in college. Additionally, there was no relationship found between level of involvement in secondary agriculture and academic performance or retention in college.

Introduction

The National FFA Organization's mission states, "FFA makes a positive difference in the lives of students by developing their potential for premier leadership, personal growth and career success through agricultural education" (National FFA Organization, 2006, p. 5). Agricultural educators use the mission statement in their efforts to promote secondary agriculture programs and the benefits to prospective students. In asserting this mission statement, agricultural educators across the country believe they know the positive influence that secondary agriculture programs make in the lives of students. Melodia and Meyer (2001) stated,

We see it every day. We see success:

- In the student who will not speak in front of the class as a freshman, but goes on to win the extemporaneous speaking contest.
- In the student who starts a college career in elementary education, only to switch to agricultural education because something is "calling" her back.
- In the student who completes an English assignment about the person who has made a major difference in his or her life and it is about the agriculture teacher.
- When the next generation of our students' children become our students.
- When a student has left the classroom and gone on to a career and after a few years finds a way to reach us and says "thank you." (p. 17)

However, the positive difference in students' lives attributed to secondary agriculture programs and FFA membership is difficult, if not impossible, to quantify. As one anonymous author wrote in *The Agricultural Education Magazine*, "we assert that the FFA develops premier leadership, personal growth and career success. But does it really? Just because we say it does, doesn't necessarily mean it really does" (Anonymous, 1999, p. 27). This raises questions as to the anecdotal versus scientific evidence agricultural educators can claim regarding agricultural education's positive influence on students' lives.

A number of studies have touted the value of secondary agricultural education and FFA membership and noted the positive impact on students' leadership, career development and agriculture knowledge and skill attainment. In 2003, Balschweid and Talbert reported that secondary agriculture students who were FFA members earned higher high school grade point averages and participated in sports, school and community activities more than students who were not members of the FFA. Involvement in secondary agriculture also promotes career opportunity. Students with secondary agriculture experience were more likely to select an agriculture major in college than students with no agriculture experience (Dyer, Lacey & Osborne, 1996). Further, according to Park and Dyer (2005), college students who had participated in secondary agriculture and/or agriculture youth organizations while in high school typically were involved in similar organizations and experiences while pursuing their college degrees. On average, college students with secondary agriculture experience and prior FFA participation were involved in at least two more collegiate student organizations and held one more collegiate leadership position than those college students with no experience in secondary agriculture or FFA (Park & Dyer, 2005).

Several studies have explored the academic success of college students with prior experience in secondary agriculture. In a multi-year study conducted at the University of Idaho, students with secondary agriculture experience and FFA membership were found to attend college fewer semesters and change majors less frequently than students who were not members (Moore & Braun, 2005). However, Moore and Braun (2005) also reported that those students had significantly lower first semester, average semester and cumulative grade point averages than students with no secondary agriculture experience. This finding contradicts Dyer, et al. (1996) who concluded there were no significant differences between students of secondary agriculture programs and those with no secondary agriculture experience when grade point averages were examined (Dyer et al., 1996).

Additionally, it was reported that rural students who had experience in agriculture, participated in secondary agriculture courses, and had been involved in agriculture youth organizations were more likely to successfully complete a degree in agriculture (Dyer, Breja & Andreasen, 1999). This finding was substantiated by other researchers (Ball, Garton & Dyer, 2001; Cole & Bokor, 1989; Dyer, Lacey & Osborne, 1996). In a study of entering college freshmen, Garton, Kitchel and Ball (2005), found a significant, positive association with enrollment in FFA and/or 4-H and attainment of a baccalaureate degree. Although this and other aforementioned studies provide some direction, one inherent limitation with the Garton et al. study is that the variable enrollment was a self-reported item that did not indicate breadth or depth of involvement. The authors recognized this by recommending that "other studies are warranted in finding a more in-depth measure of involvement in agricultural youth

organizations” (p. 411). Perhaps, a more comprehensive look at the total agricultural education program is in order.

Conceptual Framework

Terezini and Reason’s (2005) model for studying college impact served as the conceptual framework utilized for this study. The model, created from research by Pascarella and Terenzini (1991, 2005) and Terenzini and Reason (2005), was designed to address issues relating to student success and persistence in the first year of college. The framework identifies three primary categories of variables involved in the study of college impact (Figure 1). The three categories include: Pre-College Characteristics and Experience, The College Experience, and Outcomes. To meet the needs of studying college student development in an agricultural education context the initial framework has been adapted. Information including sociodemographic characteristics, academic preparation, ability and performance as well as personal and social experiences were added to the Pre-College Characteristics and Experience category. Slight modifications were also made to The College Experience category. Sub-categories were adapted to include Institutional Environment and Student Experiences. Peer Interaction was incorporated into the sub-category of Student Experiences. Finally, the Outcomes identified in the revised model were changed from Learning, Development, Change and Persistence to Learning/Development, Persistence and Career/Job Satisfaction. Additionally, specific measures were identified for the revised outcomes.

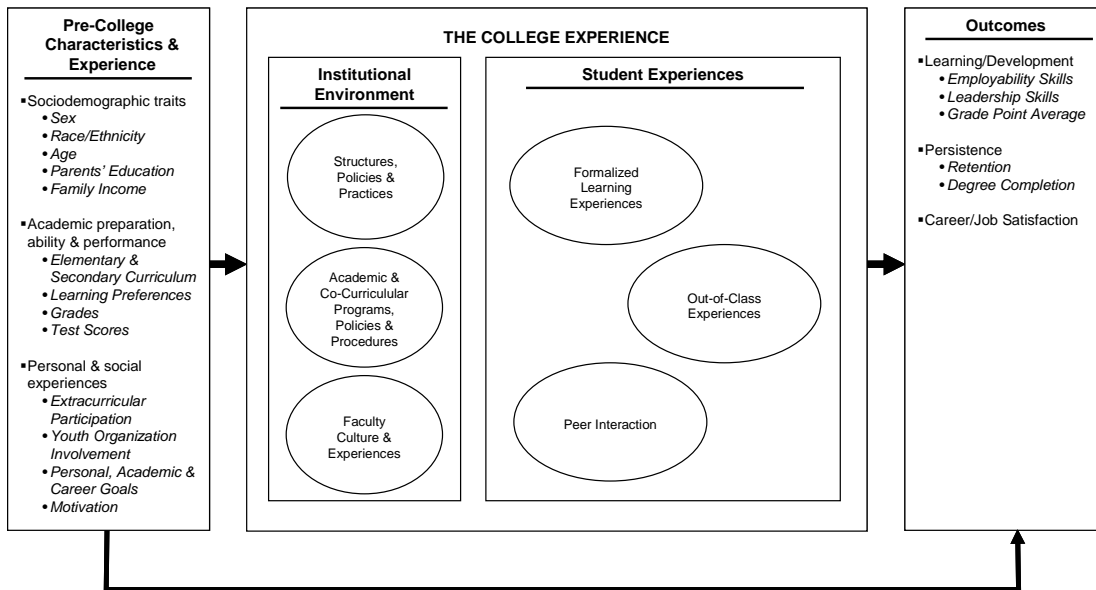


Figure 1. A model of influences on student learning (Adapted from Terenzini & Reason, 2005).

Pre-college characteristics and experiences encompass diverse factors which relate to the backgrounds and experiences of students. Included among these diverse factors are sociodemographic factors, academic preparation, ability and performance, and personal and social experiences. Each of these characteristics can have “powerful influences on students’ subsequent college experiences, learning, development, change, and persistence” (Terezini & Reason, 2005, p. 6). Participation in a secondary agriculture program and the FFA prior to

college constitutes as a pre-college experience students possess that could influence student outcomes, as supported by prior research on youth organization involvement (Ball, Garton & Dyer, 2001; Cole & Bokor, 1989; Dyer, Breja & Andreasen, 1999; Dyer, Lacey & Osborne, 1996; Garton, Kitchel & Ball, 2005).

The college experience component of the framework includes not only the institutional environment, but also student experiences. First, the college experience is influenced by the institutional environment of the college or university. Factors including institutional structures, policies, and practices, academic and co-curricular programs, policies and procedures, and faculty culture and experiences all may potentially influence students' experiences. Students' college experiences are largely influenced by formalized learning experiences, out-of-class experiences and peer interaction. For this particular framework, formalized learning experiences include such factors as curriculum, and classroom or laboratory learning. Out-of-class experiences include factors such as academic advising, educational internships, and participation in student organizations. Finally, peer interaction includes living environment, participation in freshman interest groups, sororities, fraternities, and involvement in student organizations.

The outcomes component indicates the various results or products of students' personal and educational experiences, both pre-college and college related. Potential outcomes include learning and development, persistence and career/job satisfaction. This component seems to draw certain focus as, unfortunately, challenges with academic performance and retention of students plague universities. Altogether, too many students who begin college fail to earn a degree (Carey, 2004). A substantial number of students do not continue their collegiate academic career past their freshman year. According to an ACT news release based on national data, nearly one fourth of undergraduate students do not return to their chosen four-year college or university for a second year (ACT, 2005). In addition, only 60% of entering freshman at four-year colleges or universities have been found to complete their bachelor's degree within six years (Carey, 2004).

Lankard reported that "it is unclear the extent to which participation in career and technical students organizations contributes to participants' career and occupational development" (1996, p. 1). In the age of increased accountability and high stakes standardized testing, being able to document the benefits and outcomes of secondary agriculture program enrollment and FFA participation is increasingly important. Because there is little, if any, solid evidence to support the belief that agricultural education and FFA yield concrete benefits, research in this area must be conducted (Through rose colored glasses, 1999; Lankard, 1996). If secondary agricultural education and FFA participation is truly influential, would it be plausible that these students would have greater academic success in college and be retained at a higher rate? To what extent do secondary agriculture experience and FFA involvement impact students' academic success and retention in college? Additionally, does the extent of involvement in a youth organization, such as the FFA, influence academic success and retention?

Purpose and Objectives

The purpose of this longitudinal trend-type study was to examine student participation in secondary agriculture as it relates to collegiate academic performance and retention of students

in the College of Agriculture, Food and Natural Resources at the University of Missouri-Columbia. The following research questions were developed to guide the study and applied separately to two groups (1998 and 2003) of entering freshmen:

1. Did students with prior enrollment in secondary agriculture have greater academic performance during the first year of college than students who had not enrolled?
2. Is there a relationship between the level of student involvement in secondary agriculture and academic performance during the first year of college?
3. Is there a relationship between enrollment in a secondary agriculture program and retention in college?

For the purpose of statistical analysis, the research questions were posed as null hypothesis and applied separately to the two groups (1998 and 2003).

H₀₁: There was no statistically significant difference in the collegiate academic performance of students with prior enrollment in secondary agriculture and those who had not enrolled.

H₀₂: There was no statistically significant relationship between the level of student involvement in secondary agriculture and academic performance during the first year of college.

H₀₃: There was no statistically significant relationship between enrollment in a secondary agriculture program and collegiate retention from freshman to sophomore year.

Methods and Procedures

The target population for this ex-post facto study was freshmen entering the College of Agriculture, Food and Natural Resources at the University of Missouri-Columbia. Oliver and Hinkle (1982) argued that students of a given year could be representative of other enrollment classes. Specifically, two time and place samples of entering freshman in the fall semesters of 1998 ($N_{98} = 376$) and 2003 ($N_{03} = 338$) were examined. The study was considered a longitudinal trend-type study because it sought to gather information from students in the same general population at different points in time (Ary, Jacobs & Razavieh, 2002).

Enrollment in a secondary agriculture program was determined by students' admissions applications submitted to the university and obtained by the college's academic programs office. Because of the exploratory nature of this study, students were categorized into one of two groups: prior enrollment in a secondary agriculture program or no prior enrollment.

According to the National FFA Organization, "the agricultural education program is built on the three core areas (Figure 2) of classroom/laboratory instruction, supervised agricultural experience programs and FFA student organization activities/opportunities" (National FFA Organization, n.d., What is Agricultural Science Education section).

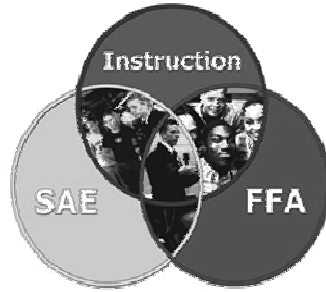


Figure 2. Three core areas of an agricultural education program (National FFA Organization, n.d., What is Agricultural Science Education section).

Classroom/laboratory learning includes instruction both in and about agriculture, and emphasizes a “learning by doing” philosophy. Secondary agriculture students are also expected to develop and carry out an agricultural experience-based project while enrolled in the program. Finally, membership in the FFA provides students with the opportunity to participate in a wide variety of leadership and/or skill based activities related to classroom instruction to help them develop personal and career-related skills and knowledge.

The Missouri State FFA Degree application takes each of the three components of an agricultural education program into consideration. Students who chose to complete the degree application must provide information about their scholastic record, FFA membership and involvement, leadership ability and breadth and depth of involvement (i. e. financial records, hours worked) from their Supervised Agricultural Experience program. Scores are assigned for meeting specific criteria in each area (Missouri Department of Elementary and Secondary Education, 2005). Therefore, the level of involvement in secondary agriculture was determined by FFA members’ scores on the State FFA Degree application. Because of the factors for which the application accounts, the State FFA Degree application scores are presumed to be an appropriate measure of an individual FFA member’s level of participation in secondary agriculture. The scores on the State FFA Degree are assigned by a state committee based on pre-established guidelines and criteria (Missouri Department of Elementary and Secondary Education, 2005). These scores were obtained from the Missouri Department of Elementary and Secondary Education.

Students’ academic performance was measured by cumulative grade point average (CGPA) at the completion of the freshman year of college. Retention was based on a student returning for his/her second year (sophomore) of college. The two pieces of information were obtained from individual student records.

Research hypothesis one was analyzed using ANOVA, while research hypothesis two utilized Pearson Product Moment correlation coefficients, interpreted using Hopkins (1997) descriptors. Research hypothesis three was tested using the Chi Square test for association. An alpha level of .05 was established a priori for all statistical tests used.

Findings

The first research question sought to determine if students with prior enrollment in secondary agriculture have greater academic performance during the first year of college than students who had not been enrolled in secondary agriculture. The null hypothesis stated there was no statistically significant difference in the academic performance of students with or without prior enrollment in secondary agriculture programs. Distinguished by two levels of the independent variable, enrollment in a secondary agriculture program, means and standard deviations for cumulative grade point average (CGPA) are reported in Table 1.

Table 1
Descriptive Statistics for Academic Performance by Prior Enrollment in a Secondary Agriculture Program

	1998				2003			
	<i>Enrolled</i> <i>(n = 100)</i>		<i>Not Enrolled</i> <i>(n = 276)</i>		<i>Enrolled</i> <i>(n = 89)</i>		<i>Not Enrolled</i> <i>(n = 248)</i>	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
CGPA	2.80	.78	2.70	.84	3.02	.68	2.71	.91

Of the entering freshmen in 1998, 100 (27%) had previously been enrolled in secondary agriculture, while 276 (73%) had no prior enrollment. The mean grade point average for students with secondary agriculture experience was 2.80, while the mean cumulative grade point average for students with no experience was 2.70. For freshmen entering in 2003, 89 (26%) had previously been enrolled in secondary agriculture. The mean cumulative grade point average for that group of students was 3.02. A total of 248 (74%) students had not been enrolled in secondary agriculture. The mean cumulative grade point average for students without secondary agriculture experience was 2.71.

For the 1998 entering freshmen, the main effect, enrollment in secondary agriculture, did not produce a statistically significant difference in students' academic performance (Table 2). For the 2003 entering freshmen, the main effect produced a statistically significant difference in students' academic performance. Based on the contradictory findings between the two groups, the null hypothesis asserting that there was no difference between the academic performance of students with and without enrollment in secondary agriculture programs was not rejected.

Table 2
Analysis of Variance of Academic Performance by Prior Enrollment in a Secondary Agriculture Program

Source	1998				2003			
	<i>df</i>	<i>MS</i>	<i>F</i>	<i>p</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>p</i>
Main Effect	1	.737	1.09	.29	1	6.22	8.52	.01*
Error	374	.673			335	.73		

* $p < .05$

The second research question sought to determine if a relationship existed between the level of student involvement in secondary agriculture and academic performance during the first year of college. The null hypothesis stated that no relationship existed between the level of student involvement in secondary agriculture, as indicated by State FFA Degree score, and academic performance during the first year of college.

Descriptive statistics for State FFA Degree score and CGPA for students enrolled in secondary agriculture are provided in Table 3. A total of 100 freshmen entering college in 1998 had been enrolled in secondary agriculture and were eligible to complete the State FFA Degree application. Of those 100 students, 89 submitted the application. The mean state degree score for those 89 students was 704.8 points. The average cumulative grade point average for those students was 2.83. In 2003, 76 of the 89 eligible students submitted the State FFA Degree application. The mean score received was 680.4. The average cumulative grade point average for students receiving the degree in 2003 was 3.06.

Table 3
Descriptive Statistics for State FFA Degree Score and Academic Performance for Freshman Year

	1998 (n = 89)				2003 (n = 76)			
	M	SD	Min.	Max.	M	SD	Min.	Max.
State FFA Degree	704.8	128.4	384	1000	680.4	121.1	357	1000
Year 1 CGPA	2.83	.82	.00	4.00	3.06	.86	.00	4.00

$r_{98} = .12$; $r_{03} = .14$

* $p < .05$

A low, positive, non-significant relationship was found for the 1997 group ($r = .12$, $p > .05$) between the level of student involvement in secondary agriculture and academic performance during the first year of college. Similarly, for the 2003 group, the correlation observed was low, positive, and non-significant as well ($r = .14$, $p > .05$). Therefore, the null hypothesis asserting that there was no statistically significant relationship between the level of student involvement in secondary agriculture and academic performance during the first year of college was not rejected.

The final research question sought to determine if a relationship existed between enrollment in secondary agriculture and retention in college. The null hypothesis stated that there was no statistically significant relationship between enrollment in secondary agriculture and retention in college.

Of the 273 students in the 1998 group, who had not been enrolled in secondary agriculture, 231(84.6%) returned for their sophomore year of college (Table 4). Of the 99 students in 1998 who had been enrolled in secondary agriculture, 87 (87.9%) returned for their sophomore year. For 2003, of the 248 who had not been enrolled in secondary agriculture, 204 (82.3%) returned for their sophomore year. Of the 89 in 2003 group who had been enrolled in secondary agriculture, 83 (93.3%) students returned for their sophomore year. The Chi Square test for association yielded a value of .624 ($p = .43$) for 1998 group, which was not statistically significant. However, the Chi Square value for the 2003 group was 6.272 ($p = .01$). Due to the

conflicting findings between the two groups, the null hypothesis stating that there was no relationship between enrollment in a secondary agriculture program and collegiate retention from freshman to sophomore year was not rejected.

Table 4
Contingency Table by Secondary Agriculture Enrollment and College Retention

	1998			2003		
	Retained Sophomore Year			Retained Sophomore Year		
	Yes	No	Total	Yes	No	Total
Not Enrolled in Secondary Agriculture	231 (84.6%)	42 (15.4%)	273 (100.0%)	204 (82.3%)	44 (17.7%)	248 (100.0%)
Prior Enrollment in Secondary Agriculture	87 (87.9%)	12 (12.1%)	99 (100.0%)	83 (93.3%)	6 (6.7%)	89 (100.0%)
Total	318 (85.5%)	54 (14.5%)	372 (100.0%)	287 (85.2%)	50 (14.8%)	337 (100.0%)

$$\chi^2_{98} (1, n = 372) = .62, p > .05; \chi^2_{03} (1, n = 337) = 6.27, p < .05$$

Conclusions/Implications/Recommendations

Enrollment in secondary agriculture programs did not produce greater academic performance, as measured by cumulative grade point average at the completion of the freshmen year of college. Overall findings were inconclusive. There was no significant difference for entering freshmen in 1998, however for the 2003 entering freshmen, the difference was significant. While a mean score difference of .31 does not seem to be a major difference between those enrolled in secondary agriculture and those not enrolled, for the 2003 entering freshmen, practically this difference in cumulative grade point average could mean the difference between receiving a university scholarship (3.02) and not receiving one (2.71). If secondary agriculture enrollment can indeed help entering freshmen achieve higher grade point averages in the first year of college, this would be a definite recruitment piece for agricultural educators, particularly with guidance counselors and parents of potential students. However, why would such a difference exist between the 1998 and 2003 entering freshmen? Further research investigating additional years is warranted to address the inconsistencies between the two groups.

The findings for both 1998 and 2003 are in conflict with prior research by Moore and Braun (2005) which reported that students with secondary agriculture experience earned significantly lower cumulative grade point averages than students with no secondary agriculture experience. The results for the 1998 entering freshmen supported the findings of Dyer, Lacey and Osborne (1996) which yielded no significant difference in the grade point averages of students with secondary agriculture program experience and those with no experience.

No relationship was found between the level of involvement in a secondary agriculture program, as measured by State FFA Degree score, and academic performance during the first year of college. Ultimately, this indicates that greater involvement in secondary agriculture programs will not necessarily yield higher grade point averages in the first year of college.

It should be noted that the data used to address this portion of the research has the potential to be skewed in nature. In 1998, a total of 74 of the 89 students with secondary agriculture experience received the State FFA Degree after meeting the minimum point value required of 576. In 2003, the degree cut-off score was 501. A total of 72 of the 76 applicants met that minimum requirement. By using only state degree scores for freshmen entering college in 1998 and 2003, the sample already excluded a number of potentially lower state degree scores. It is possible that students enrolling in college are higher achieving high school students and therefore would also be more inclined to score higher on the State FFA Degree application and earn higher cumulative grade point averages in their first year of college. It would be beneficial to look more broadly at all State FFA Degree applicants to more accurately determine if a relationship exists between the level of involvement and academic performance.

The findings lead to a question of breadth and depth of involvement in agricultural education and FFA. If studies like Garton, Kitchel and Ball (2005) found that mere enrollment in FFA and/or 4-H was influential to academic success and degree completion, yet this study suggests that degree of involvement was not influential, then why the disparity? Is it a question of mere involvement or is it the type of student that joins organizations such as 4-H and FFA that is the key? Sarver, Johnson and Verma (2000) synthesized research and identified three themes of worth of youth organizations: “(a) preparing youth to be contributing members of society, (b) providing family support, and (c) satisfying developmental needs of youth” (¶. 3). In relating this to the Terenzini and Reason (2005) model, perhaps youth organization involvement encompasses other aspects of pre-college experiences such as sociodemographic traits and other personal experiences.

Enrollment in secondary agriculture programs was not found to be related to retention in college. For students entering college in 1998, there was no significant relationship. However, for those students entering college in 2003, there was a significant relationship. Both years’ findings were contradictory to the findings of Riesenbergs and Lancaster (1990) which stated that a smaller percentage of secondary agriculture program completers returned for the second or third year of college when compared to non-completers. The results from the 2003 entering freshmen did tend to support prior research that indicates students of secondary agriculture programs are more likely to complete a degree program in a college of agriculture than those with no prior experience (Dyer, Breja & Wittler, 2000).

Based on the findings of this study, there are several recommendations for further research. Because of the inconclusive, or conflicting, results between the 1998 and 2003 data, this line of inquiry should be replicated utilizing entering freshmen from additional years and at other institutions. Perhaps a comparison of information from a number of institutions would yield more helpful findings and support the beliefs that are touted by many involved in agricultural education.

As Zirkle and Connors report, “little research exists to support the claims of career and technical student organizations of the benefits to their members” (2003, p. 16). The findings of this study echo that statement. It reiterates the need for solid information that demonstrates the value of enrollment in secondary agriculture programs and FFA membership. We claim such

involvement encourages the development of “premier leadership, personal growth and career success,” but what information do we have to substantiate that claim?

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