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Student Attrition Lookup Tool (SALT)

User's Guide

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Introduction

The Student Attrition Lookup Tool (SALT, http://www.air.org/resource/student-attrition-lookup-tool-salt) provides empirical estimates of student mobility rates to help researchers plan for student attrition when conducting studies in U.S. public schools.[1]

This user's guide provides an overview of the SALT interactive website and gives an example of how to use student mobility estimates from SALT in a power analysis. Details about the data and methods used to estimate the student mobility rates included in SALT are available in the SALT Technical Supplement.

[1] SALT was developed as part of a study funded with research grant R305D150026 from the U.S. Department of Education's Institute of Education Sciences (IES). The opinions expressed in the SALT documentation are those of the authors and do not represent the views of the Institute or the U.S. Department of Education.

SALT Shiny Application Start Page

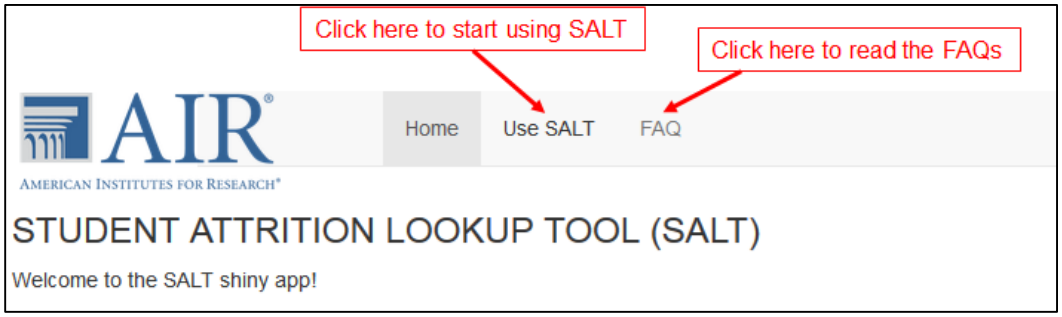
SALT is an interactive web application developed using Shiny. The SALT web application can be accessed from the AIR SALT homepage (http://www.air.org/resource/student-attrition-lookup-tool-salt) or by going directly to the Shiny application website (https://studentattrition.shinyapps.io/salt/).

The SALT shiny app start page includes a brief introduction to SALT. Users should take particular note of the three types of mobility reported in SALT:

1. *"Left school" data:* Any move ***out of the student's original school*** (attrition when only collecting data from specific study schools)
2. *"Left district" data:* Any move ***out of the student's original school district*** (attrition when only collecting data from specific school districts)
3. *"Left state" data:* Any move ***out of the state public school system***, including moves to a private school or dropping out of high school (attrition when only collecting data from specific states)

From the start page, users can navigate to the data lookup page (Use SALT) or a page of frequently asked questions (FAQ). See Exhibit 1.

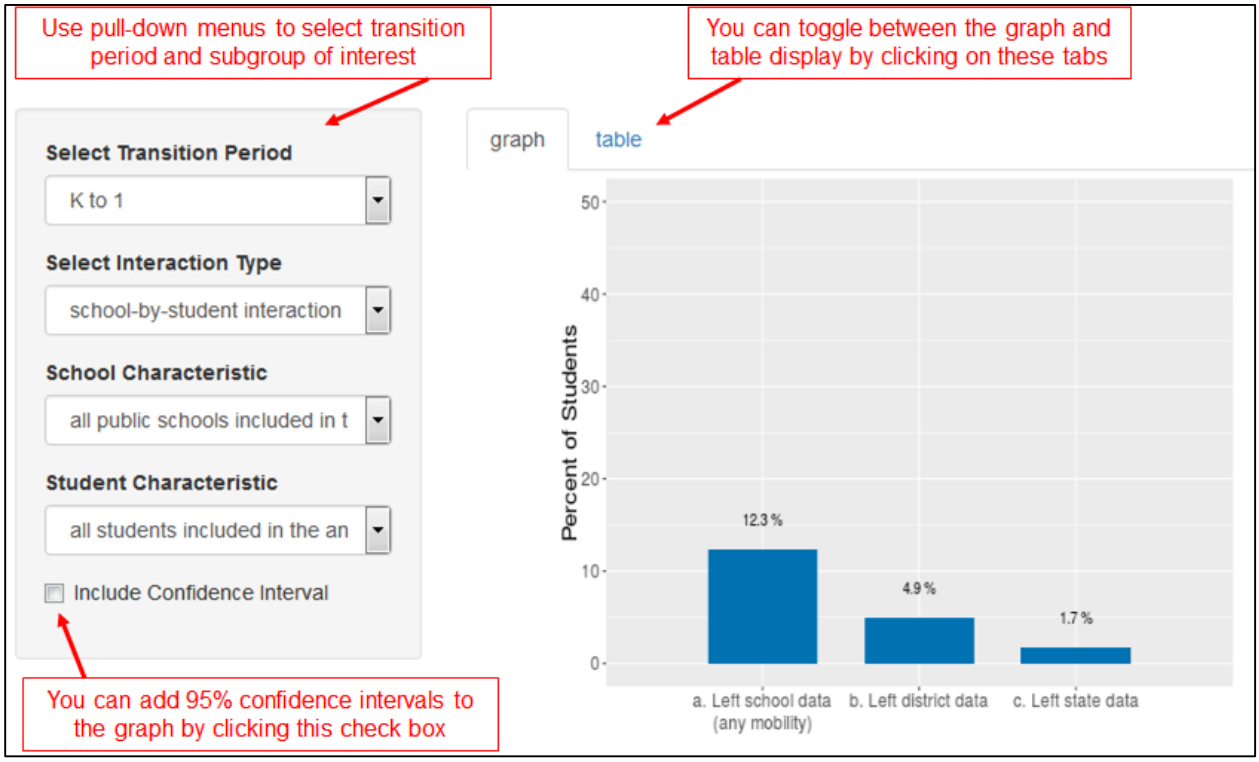
Exhibit 1. Banner for SALT Shiny App Start Page



SALT Data Lookup Page

On the SALT data lookup page, users can view student mobility rate estimates over a specific transition period and for a specific student subgroup (see Exhibit 2). Users define the transition period and subgroup of interest with the left-hand-side pull-down menus, and SALT will display estimates for the three types of mobility as either a bar graph or a table. The default display is mobility from kindergarten to first grade for all students in all public schools.

Exhibit 2. Main Elements of the Data Lookup Page



Selecting a transition period. SALT includes student mobility rates for six transition periods. Users should select the transition period that best aligns to the desired baseline grade level and grade level at follow-up. Take careful note of the number of years between baseline and follow-up. The reported mobility rates represent the percentage of students who move at some point from the baseline period (e.g., kindergarten) to the follow-up period (e.g., when the student should be in Grade 1), not the percentage of students one should expect to move in any particular year. If the specific transition period of interest is not available in SALT, we recommend looking at the mobility rates for a couple transition periods similar to the period of primary interest to get a range of possible mobility rates.

Selecting a subgroup. Users can define a subgroup in three ways, as defined in the pull-down menu for "Select Interaction Type": (1) using a "school-by-student" interaction to define a subgroup with a school characteristic and a student characteristic (e.g., students with disabilities in Title I schools); (2) using a "school-by-school" interaction to define a subgroup with two school characteristics (e.g., rural schools in the South); or (3) using a "student-by-student" interaction to define a subgroup with two student characteristics (e.g., African American males).

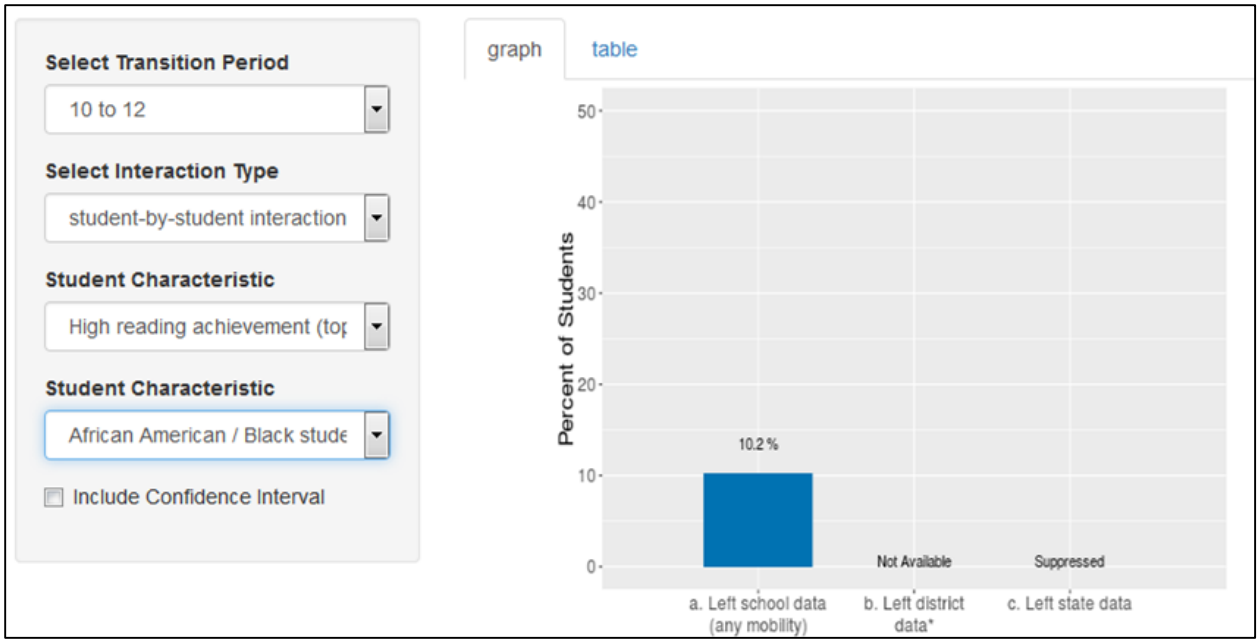
To define a subgroup based on a single school or student characteristic, users should use the "school-by-student" interaction and set the school characteristic to "all public schools" or the student characteristic to "all students."

Users should select the student subgroup that best matches the sample of interest. If SALT does not include the subgroup of primary interest, we recommend looking at the mobility rate estimates for two to three similar subgroups to see how the mobility rate estimates differ across the available subgroup options. Users can then work with a range of mobility rate estimates.

Uncertainty in mobility rate estimates. SALT includes two ways in which users can determine the amount of uncertainty in specific mobility rate estimates. In the graph display, users can choose to display the 95 percent confidence interval for each estimate by clicking on the check box below "student characteristic." The table display includes the standard error for each estimate. This information can be used to construct a range of plausible mobility rates rather than relying on a single point estimate.

Reporting limitations. There are two data limitations that preclude us from reporting some mobility rates. First, mobility rates for the "left district data" category are not available for the Grade 10 to 12 transition period because the data file for that period (the Education Longitudinal Study) did not include enough information to distinguish between students who moved to a school within the same district and those who moved to a school in a different district in the same state. As a result, all mobility rate requests for the Grade 10 to 12 transition period will return a "Not Available" for the "left district data" mobility rate. Second, for reliability and confidentiality purposes, we suppress mobility rates when less than 10 students comprise the "mover" category. An example of these reporting limitations is displayed in Exhibit 3.

Exhibit 3. Example of Unavailable and Suppressed Mobility Rate Estimates



Example: Using SALT for a Power Analysis

Consider a study where students who failed Algebra I in ninth grade will be randomly assigned to recover the course credit in an online course (treatment) or a traditional face-to-face course (control). The study will take place in a large urban school district, and the main outcome of interest is student performance on an 11th-grade math assessment. We want to conduct a power analysis to determine how many students should be in the study and whether we should request outcome data from the participating schools, the school district, or the state.

With an individual random assignment design, we can use the following formula to determine the minimum required sample size (MRSS) for a desired minimum detectable effect size (MDES):

$$MRSS_{\mu} = \left(\frac{M_{\alpha,\beta,df}}{MDES}\right)^2 \left(\frac{1-R^2}{P(1-P)}\right)\left(\frac{1}{(1-\mu)}\right),$$

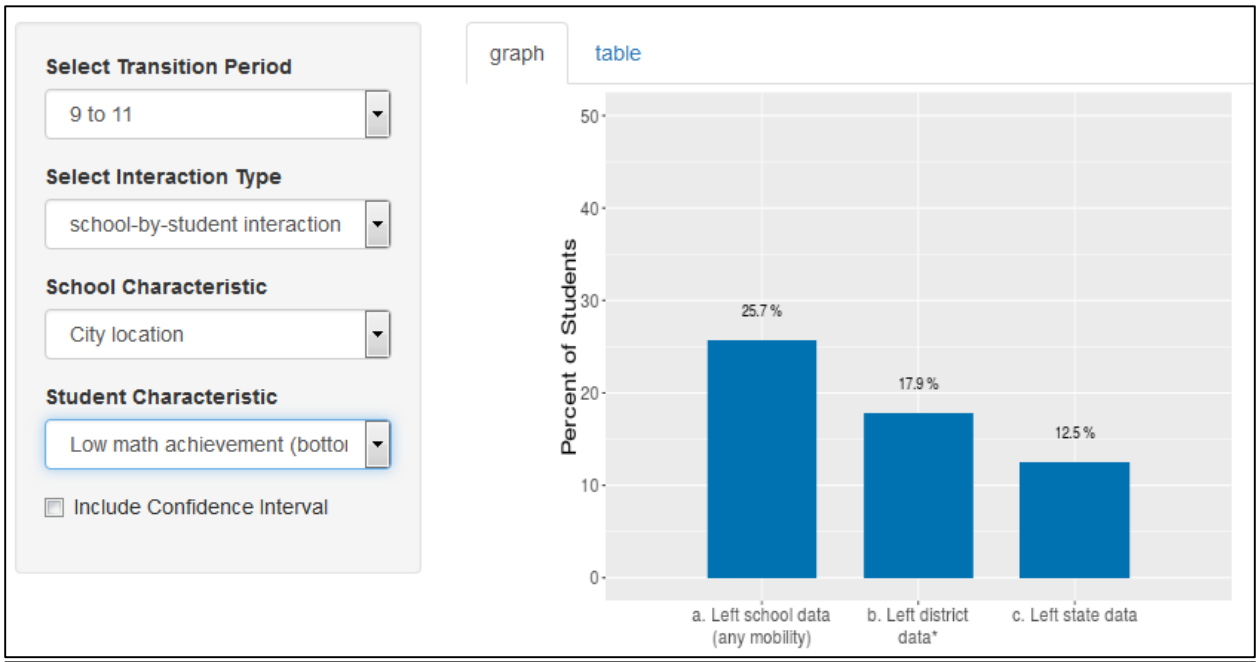
where $M_{\alpha,\beta,df}$ is the multiplier for a given alpha level (type I error), beta level (type II error), and degrees of freedom (*df*); R^2 is the proportion of variance explained by covariates; P is the proportion of units in the treatment group; and μ is the student attrition rate.

To determine plausible values for μ, we can use the student mobility rate estimates from SALT. Because the study will follow students from ninth grade to 11th grade and will focus on students who failed math in an urban district, we will select the following options on the data lookup page pull-down menu:

- Transition period = 9 to 11
- Interaction type = school-by-student interaction
- School characteristic = city location
- Student characteristic = low math achievement

These selections return the graph displayed in Exhibit 4. The student mobility estimates suggest that we will lose 25.7 percent of the student sample to attrition if we only collect data from students who remain in their original study school, 17.9 percent of the student sample if we collect data from the district, and 12.5 percent of the student sample if we collect data from the state.

Exhibit 4. Estimated Student Mobility Rates for the Grade 9 to 11 Transition Period, Students With Low Math Achievement in City Schools



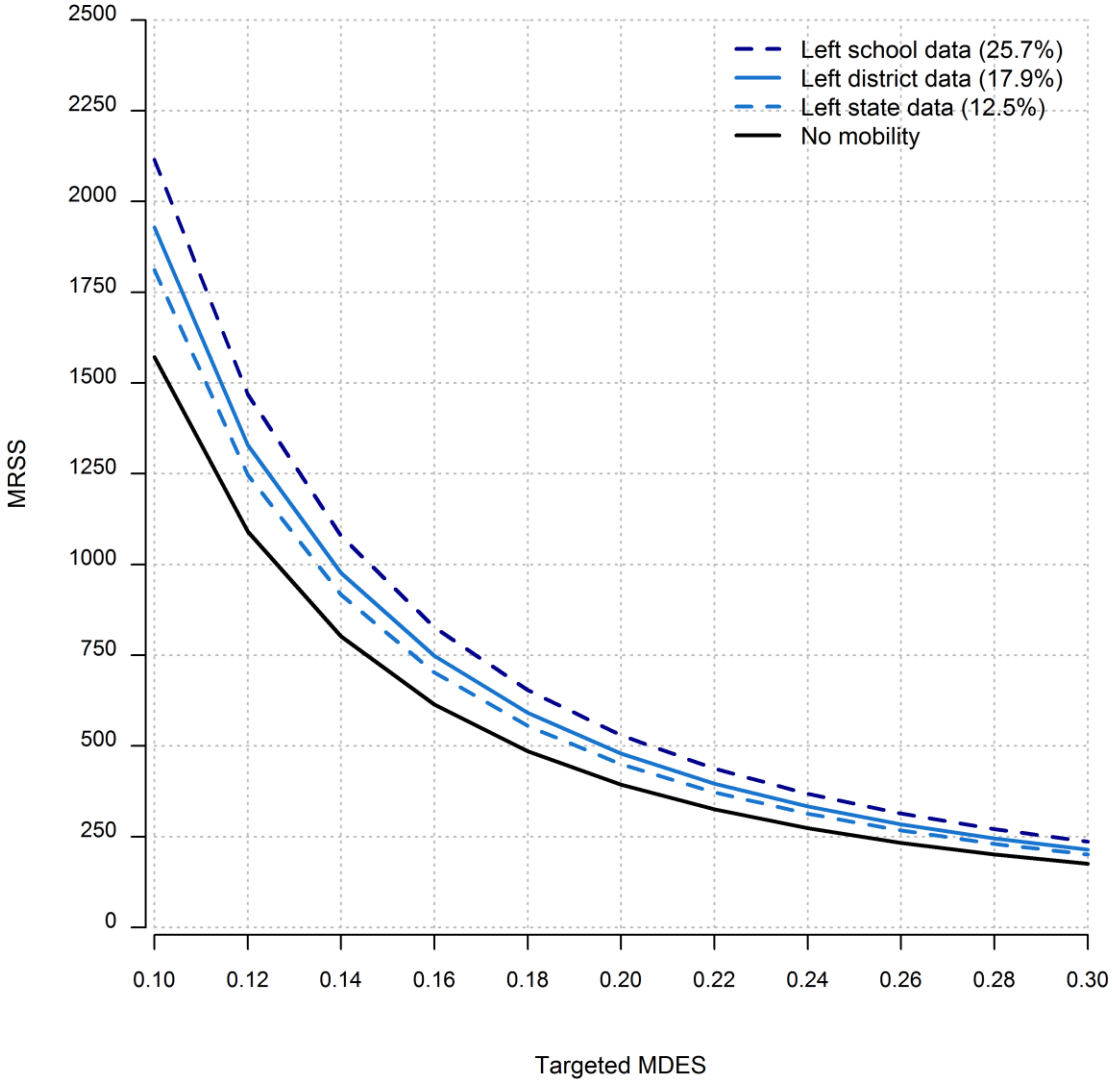
graph | table

Transition Period	Group 1	Group 2	Mobility Type	Mobility Value	Standard Error
9 to 11	City location	Low math achievement (bottom two quintiles)	a. Left school data (any mobility)	25.7%	2.90%
9 to 11	City location	Low math achievement (bottom two quintiles)	b. Left district data*	17.9%	2.09%
9 to 11	City location	Low math achievement (bottom two quintiles)	c. Left state data	12.5%	1.54%

Note. The top panel shows the graph display option. The bottom panel shows the table display option.

Returning to the power analysis formula, we can calculate the MRSS for different MDES values using the three student mobility estimates from SALT (and assuming R^2 = .50 and P = .50). The results from this exercise are displayed in Exhibit 5. The power analysis indicates that, for example, if we want an MDES of 0.12, we would need approximately 1,100 students if there was no attrition, 1,250 students if we have data for all students who stay in the state, 1,330 students if we only have data for all students who stay in the district, and 1,470 students if we only have data for students who stay in the school they attended in the ninth grade. By comparing the MRSS for the different data collection scenarios, we can determine whether additional efforts/costs to get data that capture more students (e.g., state data rather than district data) provide an adequate return in terms of lowering the MRSS.

Exhibit 5. Power Analysis Results Based on Student Mobility Estimates Retrieved From SALT



Notes. MRSS estimates are based on the following power analysis assumptions: alpha = .05 (two-tailed test), beta = 0.80, R^2 = 0.50, and P = 0.50.
MRSS = minimum required sample size
MDES = minimum detectable effect size

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