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Reporting Guide for Study Authors: Regression Discontinuity Design Studies

The WWC considers information provided about a study's context, sample, design, analysis, and findings when evaluating a study using the WWC regression discontinuity design standards. This document provides guidance to study authors about how to describe regression discontinuity design studies and report their findings in a way that is clear, complete, and transparent. The first two sections detail the descriptive information, and the third section describes the data that WWC reviewers use to assess studies. The fourth and final section details the additional descriptive information that WWC reviewers use to assess regression discontinuity design studies with multiple, pooled, or aggregated impacts. This document does not include information about how studies are judged against WWC design standards. For information about the WWC review process and design standards, please refer to the WWC Procedures and Standards Handbooks.

I. Study Characteristics and Context

A. Intervention and comparison conditions	**What curriculum, program, product, policy, or practice does the study evaluate? What services, if any, were provided to the comparison group?** Indicate the intervention's intended and actual duration, intensity, content, delivery, and any implementation supports provided. Specify whether the intervention was implemented with individuals, small groups, whole classes, or whole schools. Describe the intervention being evaluated and any services received by the comparison group in sufficient detail so that a reader understands the contrast between the two groups and what is being tested.
B. Study sample	**Who participated in the study?** In particular: • How old were students, or what grades were they in? • Were students from a general education population, or were they members of a special population (e.g., special education students or English learners)? • Did students attend charter, parochial, public, or private schools? • What are the students' background characteristics, including race or ethnicity, gender, and socioeconomic status?
C. Setting	**Where did the intervention occur?** Describe the study conditions, including: • The country or state • Whether the setting was urban, rural, or suburban • Whether the intervention occurred in- or out-of-school • Whether classrooms were regular or inclusion classrooms (if relevant) • Any other notable setting characteristics (e.g., a Title I school) • The teachers or other personnel involved in the study, including credentials, if relevant • Whether the intervention occurred in a charter, parochial, public, or private school (if relevant)

II. Study Design and Analysis

A. Measures	**What outcome measures were used to assess the impacts of the intervention?** Were the outcome measures collected using the same procedures for the intervention and comparison groups? Were the outcome measures standardized tests? If an outcome measure was not a standardized test, provide a complete description of the measure, how scores were calculated, and information on its psychometric properties (i.e., internal consistency, test-retest reliability, and inter-rater reliability). If an outcome measure was not administered and scored using established procedures, describe the procedures used.
B. Design	**How were eligible students, classrooms, teachers, and/or schools identified and recruited for the study? How were study participants assigned to the intervention and comparison groups?** Describe the assignment process, including: • Whether individuals or clusters of individuals (such as classrooms or schools) were assigned to conditions • The assignment variable used (sometimes called the forcing or running variable) • The cutoff value selected, who selected the cutoff (e.g., researchers, school personnel, curriculum developers) • Who determined values of the assignment variable (e.g., who scored a test) • When the cutoff was selected relative to determining the values of the assignment variable
C. Analytic approach	**What analytic models or methods were used?** In particular: • What analytic models and methods were used to estimate the effects of the intervention? What analytic models and methods were used to determine whether those estimated effects were robust to varying bandwidth or functional form choices? For all analytic models, describe the methods used to select the bandwidth and/or functional form. • Which variables were controlled for in the analysis? • Was the analysis conducted using data on individuals, or were the data aggregated to groups for analysis? • Which units were included in the analytic sample—the sample used to measure the impact of the intervention? If any units were excluded, what was the reason? • For regression discontinuity designs that assigned clusters to conditions, were any individuals who may have entered clusters after treatment assignment included in the analysis? When did those individuals enter clusters? • How were standard errors and statistical significance calculated, including any adjustments made to correct for clustering of standard errors or for testing multiple hypotheses (e.g., a Benjamini-Hochberg procedure was used to account for multiple outcomes)?
D. Missing data	**How did the analysis account for missing data?** Which methods and software were used to address missing data? Were these methods used to address missing outcome measures or pre-intervention measures? Did the methods used to calculate standard errors and statistical significance account for the presence of imputed data (e.g., by estimating impacts using multiple imputations)?
E. Density of the assignment variable	**What is the density of the assignment variable near the cutoff value?** Examine this density using a statistical test (e.g., McCrary, 2008) and a graph (e.g., a histogram or other type of density plot). Report the results of the test and present the graph.

F. Discontinuities in the outcome-assignment variable relationship away from the cutoff	**Were there discontinuities in the outcome-assignment variable relationship at values of the assignment variable other than the cutoff value?** Examine this relationship using statistical tests (e.g., estimating impacts at values of the assignment variable other than the cutoff value) and a graph (e.g., a scatter plot of the outcome and assignment variable). Report the results of the tests and present the graph.
G. Graphical analysis	**What does the relationship between the outcome and the assignment variable look like?** Present a graph displaying the relationship between the outcome and the assignment variable, including a scatter plot and a fitted curve.
H. Fuzzy regression discontinuity designs	**For studies that report fuzzy regression discontinuity design impact estimates (i.e., "treatment-on-treated" impact estimates), is the assignment variable a strong predictor of participation in the intervention?** Report either the F-statistic or t-statistic for the coefficient on the intervention assignment indicator (i.e., an indicator for being above or below the cutoff value) from a regression of program participation (i.e., an indicator for receiving intervention services) on the intervention assignment indicator, the assignment variable, and other covariates (if relevant).

Reference: McCrary, J. (2008). Manipulation of the running variable in the regression discontinuity design: A density test. *Journal of Econometrics*, *142*(2), 698–714.

III. Study Data

Table 1. Information to include for each outcome measure, time point, and comparison

1. Provide values for key pre-intervention measures and characteristics. Review relevant WWC review protocols to understand what pre-intervention measures or characteristics the WWC may want to examine. Examples include other pre-intervention measures that may be related to the outcome measure, student age, and race or ethnicity.

3. What is the unadjusted standard deviation for each measure or characteristic for the analytic sample? If the measure or characteristic is dichotomous (meaning it takes on just two values, like yes/no or 0/1), report the predicted mean values on each side of the cutoff instead of the unadjusted standard deviation. For studies that assigned clusters to groups, report standard deviations using individual-level data rather than data aggregated to the cluster-level, if possible.

	Intervention group		Comparison group		Estimated effect	
	Sample size	Standard deviation (or, for dichotomous measures, predicted mean value at the cutoff)	Sample size	Standard deviation (or, for dichotomous measures, predicted mean value at the cutoff)	Estimated impact at the cutoff value	p-value
Outcome measure						
Pre-intervention measure						
Other pre-intervention characteristic 1						
Other pre-intervention characteristic 2						

2. How many individuals are in the analytic sample? Report this number for either the entire research sample or the sample inside the bandwidth. Use the same sample definition (either the entire research sample or the sample inside the bandwidth) for all rows in this table. Additionally, provide analytic sample sizes for any sensitivity analyses conducted.

4. Provide the statistic used to estimate the effect of the intervention on the measure or characteristic (e.g., a regression coefficient) and, for outcome measures only, the associated p-value.

Table 2. Sample sizes at the time of assignment and predicted mean attrition rates at the cutoff

1. How many units were assigned to the intervention and comparison conditions? Use the same sample definition used in Table 1.

Outcome measure	Sample size at time of assignment		Predicted mean attrition rate at the cutoff	
	Intervention group	Comparison group	Intervention group	Comparison group
Measure 1				
Measure 2				
Measure 3				

2. What is the predicted mean attrition rate at the cutoff estimated using data from below the cutoff, and the predicted mean attrition rate at the cutoff estimated using data from above the cutoff? Both numbers must be estimated using the same approach and sample definition that was used to estimate the impact on the outcome shown in Table 1.

3. If the study assigned clusters to conditions, provide the information in this table for the sample of clusters. Additionally, the WWC may require information about individual-level non-response or whether the individuals who contribute outcome or baseline data are representative of the clusters. See Section F of Chapter III in the *WWC Standards Handbook* for more information.

IV. Multiple, Pooled, or Aggregated Impacts

A. Multiple impacts	**If the study reports multiple separate impacts (e.g., impacts for different outcomes or subgroups of interest), report all of the above information separately for each impact (i.e., outcome-subgroup combination).**
B. Pooled impacts	**If the study reports an impact that is pooled across multiple combinations of assignment variables, cutoffs, and samples, report the following information:** • Report II.B separately for each combination of assignment variable, cutoff, and sample. "Pooled" means that data from each combination of assignment variable, cutoff, and sample are standardized and grouped into a single data set for which a single impact is calculated. If any combinations of assignment variable, cutoff, and sample are excluded from the pooled impact, demonstrate that those exclusions were made for reasons exogenous to intervention participation.
C. Aggregated impacts	**If the study reports an impact that is aggregated across multiple combinations of assignment variables, cutoffs, and samples, report the following information:** • Report II.B, II.C, II.E, II.F, II.G, and II.H separately for each combination of assignment variable, cutoff, and sample. • Report overall and differential attrition rates calculated as weighted averages of the overall and differential rates calculated for each combination of assignment variable, cutoff, and sample that contributed to the aggregate impact, using the same weights used to calculate the weighted impact on the outcome. • Report aggregate impacts on pre-intervention measures and characteristics calculated by applying the same aggregation approach to the impacts on pre-intervention measures and characteristics as was used to aggregate impacts on outcomes. "Aggregated" means the impact is a weighted average of impacts that are calculated separately for every combination of assignment variable, cutoff, and sample. If any combinations of assignment variable, cutoff, and sample are excluded from the aggregated impact, demonstrate that those exclusions were made for reasons exogenous to intervention participation.