



## Improving the Efficiency and Effectiveness of Instruction with Progress Monitoring and Formative Evaluation in the Outcomes Driven Model

Roland H. Good III, Ph.D.  
Dynamic Measurement Group, Inc.  
University of Oregon.

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## Agenda

- Rationale for progress monitoring and formative evaluation
- Ordinary least squares slope of progress
- Issues with slope
- Student Progress Percentiles: Pathways of Progress™
- Results
- Discussion

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## What is progress monitoring and formative evaluation?

To implement progress monitoring, the student's **current levels of performance** are determined and **goals are identified** for learning that will take place over time. The student's academic performance is **measured on a regular basis (weekly or monthly)**. Progress toward meeting the student's goals is measured by **comparing expected and actual rates of learning**. Based on these measurements, **teaching is adjusted** as needed. Thus, the student's progression of achievement is monitored and instructional techniques are adjusted to meet the individual students learning needs.

<http://www.studentprogress.org/progresmon.asp#2>  
Accessed: 1/22/2015

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John Hattie (2009) evaluated more than 800 meta-analyses of 138 influences on student achievement:

- Student
- Teacher
- Teaching
- Curricula
- School
- Home

Influences on achievement we can do something about.

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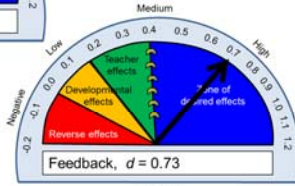
## Selected Hattie (2009) Findings...

Desirable *Goals* are:

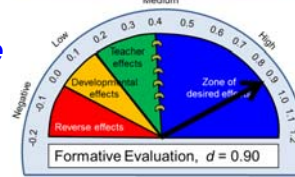
Meaningful,  
Attainable,  
Ambitious



Feedback to teachers & students:  
Is what we are doing working?



Progress Monitoring and Formative evaluation is the 3<sup>rd</sup> largest effect on student achievement out of 138 possible influences.



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## Defensible Progress Monitoring Requires...

- An interpretive framework within which to determine if progress is adequate or not.
- Accurate measurement at the individual student level
- Progress decisions that demonstrate:
  - ✓ reliability (decision stability)
  - ✓ evidence of validity (including decision accuracy)
  - ✓ appropriate normative comparisons
  - ✓ decision utility (result in improved outcomes)

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## Progress Decisions in an Outcomes-Driven Model

- ▶ Outcomes Driven Model Steps:
- ▶ Identify need for support.
- ▶ Validate need for support.
- ▶ Plan and implement support.
- ▶ Evaluate and modify support.
- ▶ Review outcomes.

Progress decisions assist in *setting goals* and *evaluating progress*.



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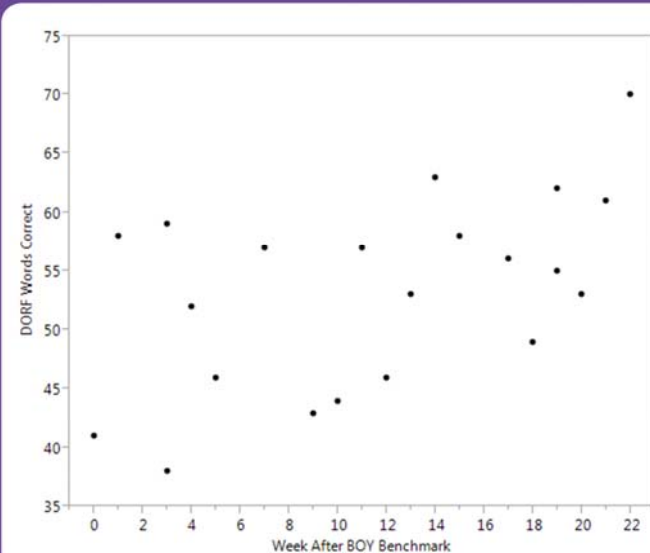
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## Student Progress Decisions Example: Ryan



• DIBELS Oral Reading Fluency

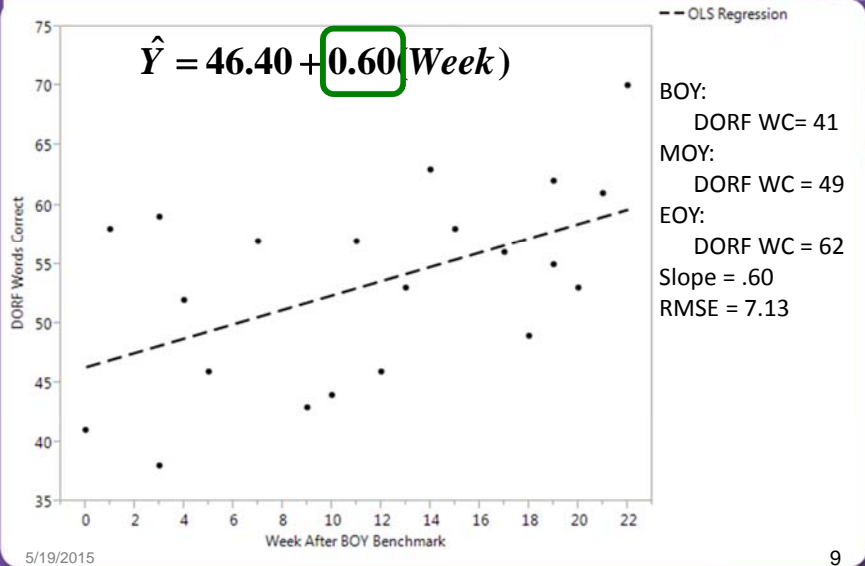
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## Slope of Student Progress: Ryan



## Study 1 Descriptive Statistics

Descriptive Statistics for DIBELS Next Oral Reading Fluency-Words Correct by Number of Weeks and Number of Progress Monitoring Assessments

| Subset of data       | N       | Number of progress monitoring assessments |      |     |     | BOY DORF Words Correct |       |
|----------------------|---------|---|------|-----|-----|------------------------|-------|
|                      |         | M   | SD   | Min | Max | M                      | SD    |
| All students         | 151,138 | 8.72                                      | 4.75 | 2   | 59  | 68.93                  | 32.86 |
| 6 weeks, 5+ points   | 6785    | 5.62                                      | 0.95 | 5   | 16  | 48.62                  | 22.65 |
| 10 weeks, 9+ points  | 2813    | 9.72                                      | 1.2  | 9   | 22  | 46.47                  | 20.69 |
| 14 weeks, 13+ points | 1087    | 13.85                                     | 1.68 | 13  | 27  | 45.87                  | 18.88 |
| 18 weeks, 17+ points | 218     | 18.67                                     | 2.82 | 17  | 33  | 46.15                  | 17.98 |
| 22 weeks, 21+ points | 99      | 23.68                                     | 3.99 | 21  | 40  | 43.44                  | 18.59 |

Note. Data were divided into subsets based on a minimum data requirement: for six weeks, students with at least five data points were included; for 10 weeks, students with at least nine data points were included; for 14 weeks, students with at least 13 data points were included, and so on.

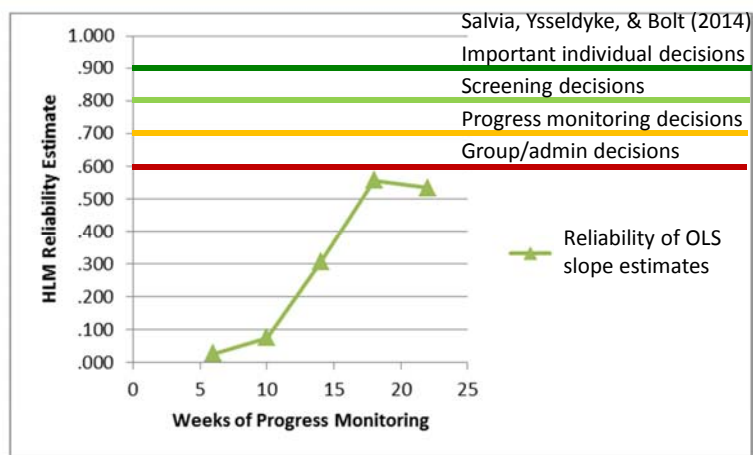
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## Study 1 Reliability of Student Slope Estimates



HLM estimates of the reliability of the individual student measure used to evaluate student progress at 6, 10, 14, 18, and 22 weeks.

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## Caution

*"The conclusion across multiple studies seems apparent: CBM-R progress monitoring is not an evidence-based practice for modeling growth of individual students' gains in reading. Substantial research is necessary to guide progress monitoring implementation, if it is to be established as an evidence-based practice."*

Ardoin, Christ, Morena, Cormier, & Klingbeil (2013)

***At the very least, caution is warranted when considering slope of student progress.***

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## An Alternative to Slope: Student Growth Percentile

Student growth percentiles provides a measure of "how (ab)normal a student's growth is by examining their current achievement relative to their academic peers -- those students beginning at the same place" (Betebenner, 2011, p. 3).

Potential advantages of student growth percentiles:

1. Progress decisions are based on the *level* of student performance at a point in time.
2. Level can be estimated with high reliability using
  - The mean of the most current 3 assessments.
3. Slope of student performance is not required and not estimated.

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## DIBELS® Pathways of Progress™ Student Growth Percentile

As implemented in DIBELS® Pathways of Progress™

1. For each unique BOY DIBELS Composite Score (DCS), the 20th, 40th, 60th, and 80th quantiles were calculated for DORF WC.
2. A stiff, spline quantile regression model was fit to each quantile using BOY DCS as the predictor.
3. The predicted quantile scores from the regression model corresponding to each unique BOY DCS formed the end-of-year pathway borders.
4. Pathway borders were linearly interpolated for each week after BOY benchmark using the BOY DORF WC at week zero and the EOY Pathways of Progress border at week 35

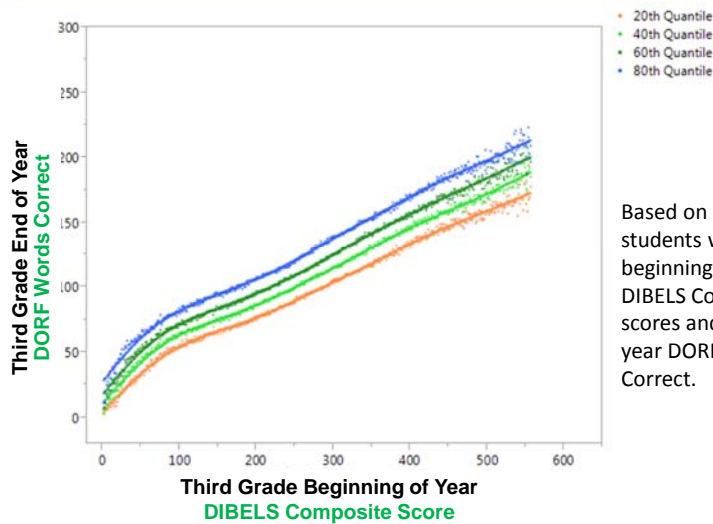
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## Student Growth Percentile Spline Quantile Regressions



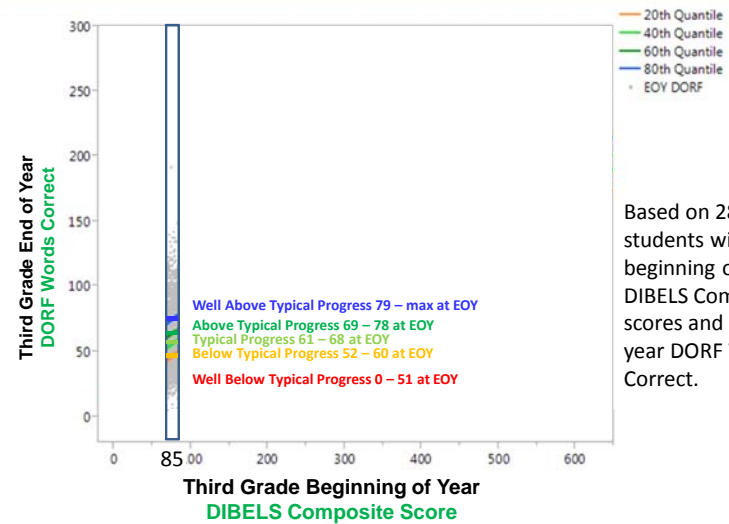
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## Pathways of Progress: Spline Quantile Regressions



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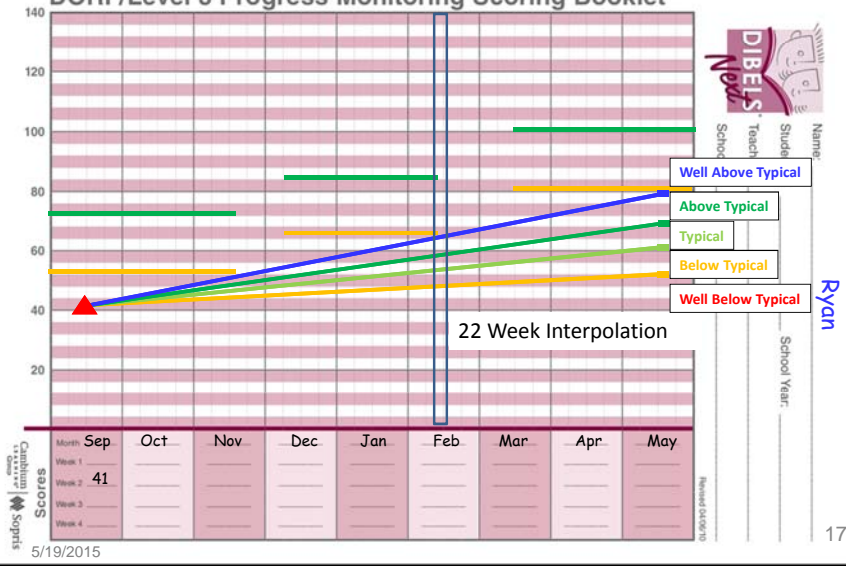
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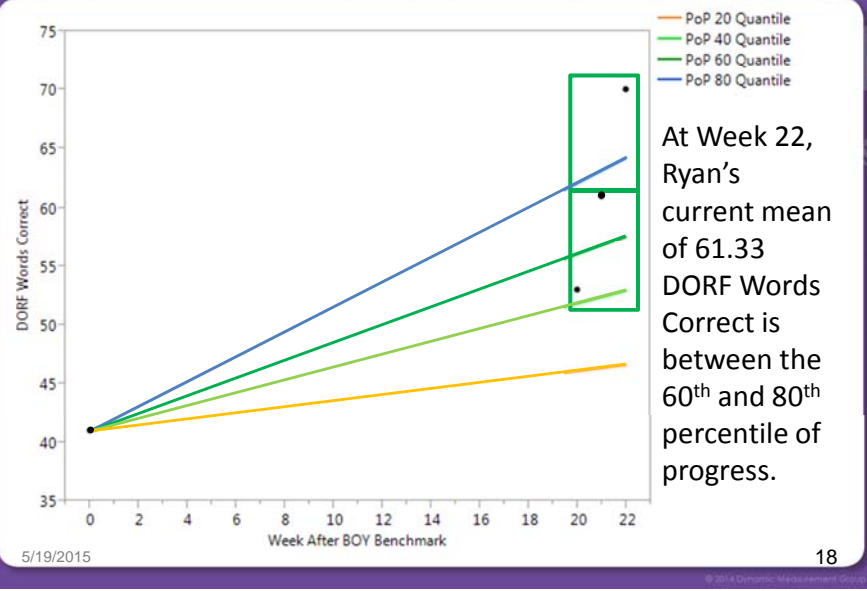
# Progress Monitoring

DORF LEVEL 3

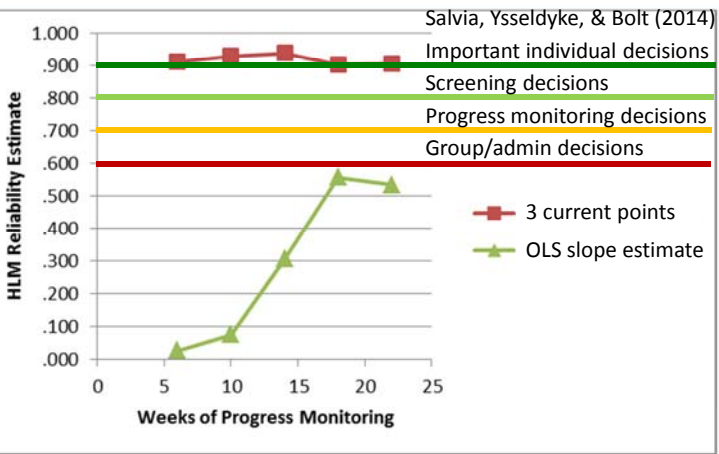
## DORF/Level 3 Progress Monitoring Scoring Booklet



# Ryan's Progress at Week 22 Based on Mean of 3 Current Points



# Study 1: Reliability of 3 Current Points



HLM estimates of the reliability of the individual student measure used to evaluate student progress at 6, 10, 14, 18, and 22 weeks.

# Study 2 Cohorts

- A K-1 Cohort was assessed at the beginning of kindergarten (BOY K), at the end of kindergarten (EOY K) and at the end of first grade (EOY 1).
- A 3-4 Cohort was assessed at the beginning of third grade (BOY 3), at the end of kindergarten (EOY 3) and at the beginning of fourth grade (BOY 4).

| Cohort | Variable               | N      | M      | SD     |
|--------|------------------------|--------|--------|--------|
| K-1    | BOY K DIBELS Composite | 35,328 | 34.92  | 25.63  |
| K-1    | EOY K DIBELS Composite | 35,328 | 147.46 | 44.21  |
| K-1    | EOY 1 DIBELS Composite | 35,328 | 192.35 | 85.05  |
| 3-4    | BOY 3 DIBELS Composite | 7,157  | 272.08 | 106.95 |
| 3-4    | EOY 3 DIBELS Composite | 7,157  | 388.35 | 112.02 |
| 3-4    | BOY 4 DIBELS Composite | 7,157  | 336.37 | 114.52 |



# Third Grade DIBELS Composite Score

## Beginning of Year Benchmark

DORF Words Correct = \_\_\_\_\_ [1]

Retell Score \_\_\_\_\_ x 2 = \_\_\_\_\_ [2]

Daze Adjusted Score \_\_\_\_\_ x 4 = \_\_\_\_\_ [3]

DORF Accuracy Percent: \_\_\_\_\_ %  
100 x (Words Correct / (Words Correct + Errors))

Accuracy Value from Table = \_\_\_\_\_ [4]

**DIBELS Composite Score (add values 1-4) = \_\_\_\_\_**

If DORF is below 40 and Retell is not administered, use 0 for the Retell value only for calculating the DIBELS Composite Score. Do not calculate the composite score if any of the values are missing.

1. Reading at an appropriate rate
2. Reading orally with understanding
3. Reading silently for meaning in context
4. With a high degree of accuracy

DIBELS® Composite Score represents **reading for meaning** at an **adequate rate** and with a **high degree of accuracy**.



# Study 2: K-1 Cohort Effects of BOY Status and Pathway

Outcome: End of first grade DIBELS Composite score.

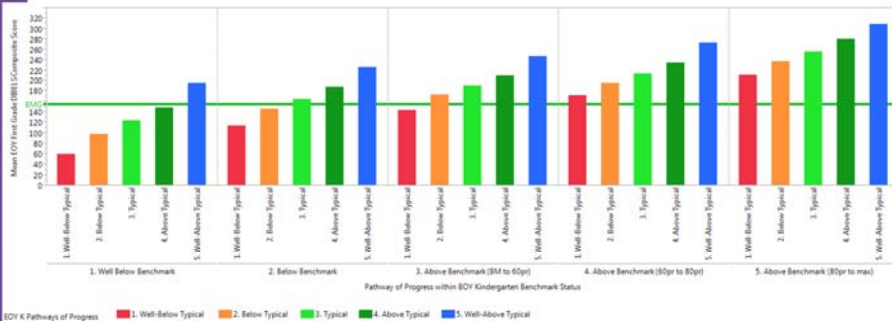
| Source                       | F         | eta squared |
|------------------------------|-----------|-------------|
| BOY grade K benchmark status | 4,979.12* | .306        |
| Grade K progress             | 3,045.00* | .187        |
| Status * progress            | 12.11*    | .003        |

\*p < .001.



# Study 2: K-1 Cohort Pathways within Benchmark Status

Relation of Kindergarten beginning of year benchmark status and Kindergarten pathway of progress to Grade 1 end of year DIBELS Composite Score (n = 35,328).



BOY K Pathways of Progress: 1. Well-Below Typical, 2. Below Typical, 3. Typical, 4. Above Typical, 5. Well-Above Typical



# Study 2: 3-4 Cohort Effects of BOY Status and Pathway

Outcome: Beginning of fourth grade DIBELS Composite score.

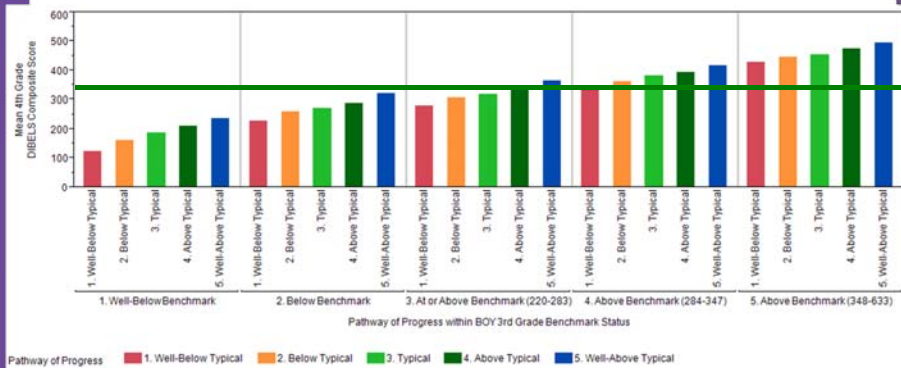
| Source                       | F         | eta squared |
|------------------------------|-----------|-------------|
| BOY grade 3 benchmark status | 4,347.15* | .657        |
| Grade 3 progress             | 368.36*   | .056        |
| Status * progress            | 2.31      | .001        |

\*p < .001.



## Study 2: 3-4 Cohort Pathways within Benchmark Status

Relation of Grade 3 beginning of year benchmark status and Grade 3 pathway of progress to Grade 4 beginning of year DIBELS Composite (n = 7,157).



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## Conclusions

1. The reliability of the *individual student measure* upon which progress decisions are based is much higher for Pathways of Progress than for OLS slope.
2. Progress in Kindergarten and progress in third grade are related to later reading outcomes over and above initial skills.

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## Limitations

- We do not have information on assessment fidelity & we do not know the level of assessor training. However, these data do represent the way *DIBELS Next* is used in practice.
- Rates of progress were not experimentally manipulated. They are potentially manipulable, and their ultimate value will depend upon the impact on student outcomes.
- The week after the BOY benchmark represents a straight calendar week. We were not able to model instructional weeks accounting for school holidays or breaks.

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## Where Can I Get More Information?

DMG website: [www.dibels.org](http://www.dibels.org)

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## References

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