

Data-based Decision Making Cultures: Four Assumptions

Ronnie Detrich
Wing Institute

Association for Positive Behavior Support
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Goals for Today

- Describe the four assumptions necessary for data-based decision making to be effective.
- Explore the degree to which these assumptions are currently true.

Context for Data-based Decision Making

- Influence of problem solving model (Deno, 2005).
 - Problem: Discrepancy between expected and actual performance.
 - Data help identify discrepancies.

Why Data-based Decision Making?

- Data is only one basis for making decisions.
 - Intuition
 - Experience
 - Authority
 - Persuasion
 - Preference

Why Data-based Decision Making?

- Advantages:
 - Replicable
 - Transparent
 - Objective
- Disadvantages
 - Difficult to implement
 - Loss of certainty
 - May not confirm our preferences

Function of Data-based Decision Making

Increase the probability that socially valued outcomes will be achieved.

- Applies to all levels of a system:
 - students
 - staff
 - resource allocation
 - organizational

Data-based Decision Making as Ethical Obligation

- DBDM central in many ethical standards for:
 - selecting interventions
 - evaluating interventions

Data-based Decision Making as Ethical Obligation: Selecting Interventions

- American Psychological Association Ethical Standard 2.04:
 - *Psychologists' work is based on the **established scientific and professional knowledge** of the discipline.*

Data-based Decision Making as Ethical Obligation: Selecting Interventions

- National Association of School Psychologists
 - Standard III F 4.
 - ☐ *School psychology faculty members and clinical or field supervisors uphold recognized standards of the profession by providing training related to high quality, responsible, and **research-based** school psychology services.*

Data-based Decision Making as Ethical Obligation: Selecting Interventions

- National Association of School Psychologists
 - Standard IV 4.
 - ☐ School psychologists use assessment techniques, counseling and therapy procedures, consultation techniques, and other direct and indirect service methods that the profession considers to be **responsible, research-based practice**.

Data-based Decision Making as Ethical Obligation: Selecting Interventions

- Behavior Analyst Certification Board
 - Standard 2.09a
 - ☐ The behavior analyst always has the responsibility to recommend **scientifically supported, most effective treatment procedures**. Effective treatment procedures have been validated as having both long-term and short-term benefits to clients and society.
 - Standard 2.09b
 - ☐ Clients have a right to effective treatment (i.e., based on the **research literature** and adapted to the individual client).

Data-based Decision Making as Ethical Obligation: Evaluating Interventions

- National Association of School Psychologists
 - Standard IV C 1b.
 - ☐ Decision-making related to assessment and subsequent interventions is primarily **data-based**.
 - Standard IV 6.
 - ☐ School psychologists develop interventions that are appropriate to the presenting problems and are consistent with the data collected. They modify or terminate the treatment plan **when the data indicate** the plan is not achieving the desired goals.

Data-based Decision Making as Ethical Obligation: Evaluating Interventions

- Behavior Analyst Certification Board
 - Standard 4.04
 - ☐ The behavior analyst **collects data** or asks the client, client-surrogate, or designated other to collect data needed to assess progress within the program.
 - Standard 4.05
 - ☐ The behavior analyst **modifies the program on the basis of data**.

Data-based Decision Making as Ethical Obligation

- Services funded by tax dollars.
 - Dollars are for public benefit.
 - Fiduciary responsibility to assure educational benefit to everyone.
 - Data-based decision making provides the best chance of assuring benefit.
 - If DBDM is an ethical responsibility then it follows that assuring there is a system to support DBDM is also an ethical responsibility.

Basis for Choosing Treatment

Szatmari (2004)



Do Nothing	
Unethical Clinical Paralysis	None

Do Nothing	
Unethical Clinical Paralysis	None

Toss a Coin	
Unethical in light of evidence	None

Do Nothing		Toss a Coin	
Unethical Clinical Paralysis	None	Unethical in light of evidence	None

Training	
Outdated	None
Current	lots

Do Nothing		Toss a Coin		Training	
Unethical Clinical Paralysis	None	Unethical in light of evidence	None	Outdated	

Etiology	
Difficult	limited

Do Nothing	Toss a Coin	Training	Etiology
Unethical Clinical Paralysis	None	Outdated	Difficult
	Unethical in light of evidence		limited

ABA	
Not very humane effective	lots

Do Nothing		Toss a Coin		Training		Etiology	
Unethical Clinical Paralysis	None	Unethical in light of evidence	None	Outdated		Difficult	Limited

ABA	
Not very humane	lots

Developmental Social cognitive	
Love it	Not yet

To be Ethical:
Inform Parents of Options

Do Nothing		Toss a Coin		Training		Etiology	
Unethical Clinical Paralysis	None	Unethical in light of evidence	None	Outdated		Difficult	Limited

ABA	
Not very humane	lots
Effective	

Developmental social cognitive	
Love it	Not yet

Four Assumptions

- Data are reliable and valid.
- Decision-makers have the skills to base decisions on data.
- Decision-makers know what to do when a problem is identified.
- Those responsible for implementing a solution have the skills, supports, and resources to implement with integrity.

Assumption 1: Reliable and Valid Data are Available

- Reliable: Two measures of the same phenomenon result in the same score.
 - Across recorders (inter-observer agreement).
 - Same instrument measuring same phenomenon on different occasions (test-retest).
 - ☐ Consider a thermometer:
 - ✓ two thermometers measuring the same temperature should obtain the same result.
 - ✓ the same thermometer should obtain the same result in back to back measurements.
 - Reliability is not necessarily accuracy.

Assumption 1: Reliable and Valid Data are Available

- Valid: assessment is measuring what it purports to measure.
- Validity is contextual.
 - A measure can be valid for one purpose but not for another.

Validity and Inference

Low Inference

Behavior of interest in its own right.
No attempt to generalize to other times, settings, behaviors.
Changes in behavior have no predictive value.
Example: Talking out

High Inference

Behavior interesting as a measure beyond its immediate context.
Generalize from behavior within a context to other times, settings, and behaviors.
Changes in behavior predict changes in risk status.
Example: Words read correctly/minute

General Outcomes Measures (GOMS)

- Both Rtl and PBS are prevention approaches.
- In many instances, we want to know the predictive value of a measure.
 - Level of risk for academic and social difficulties.
 - provide appropriate intensity of intervention.

Reliability and Validity

- CBM valid for (Stecker, Fuchs, & Fuchs, 2005):
 - identifying both successful and unsuccessful students in reading, math, and spelling.
 - identifying which students are more likely to have later academic difficulties if unaddressed.
 - how well students will perform on high stakes tests.
- CBM is valid GOM for academic difficulties.
 - Level of intensity of intervention can more precisely be determined rather than going from Tier 1-2-3.

Office Discipline Referrals and Reliability

- Same event may result in a referral on one occasion but not another.
 - Lack of consistency within and across teachers is an issue.
- Same event may not always be coded in the same way within and across teachers.
 - Makes it difficult to identify what behaviors are being identified through referrals.
- Usually high agreement that a referral has occurred.
- Use of SWIS increases consistency:
 - of reporting
 - what is reported
 - how it is coded

Office Discipline Referrals and Validity

- Office Discipline Referrals may measure student behavior but may also measure teacher behavior.
- ODR valid for making statements of level of risk for other socially relevant behaviors (delinquency, academic difficulties, etc.) (Irwin et al., 2004 for review).
 - Nelson (2002) ODR may not be valid for identifying students at risk.
 - ❑ Too many false negatives
 - ✓ Especially, among students with internalizing problems

Assumption 1: Reliable and Valid Data are Available

- More likely to be the case for academic performance than social behavior.
 - Especially, in elementary school.
 - ❑ Measures such as words read correctly per minute, digits correct, and letters correct are well established measures.
 - ✓ Students doing well on these measures are more likely to meet literacy goals.

Reliable and Valid Data Are Available

- To date, no valid general outcome measures for “social literacy.”

Assumption 2: Decision Makers Have Skills and Supports to Base Decisions on Data

- Most student level data displayed in graphs.
- Several studies suggest that persons with advanced training in behavior analysis are not reliable at interpreting graphic data displays.
 - DeProspero & Cohen (1979)
 - ❑ Reviewers of behavioral journals IOA = 61% (mean).
 - ❑ How will less skilled decision makers perform under the same conditions?

Assumption 2: Decision Makers Have Skills and Supports to Base Decisions on Data

- Hagopian, et al., (1997)
 - Developed decision rules for interpreting visual display of functional analysis data and trained predoctoral interns to apply the criteria.
 - ❑ IOA increased from a baseline of .46 to .81

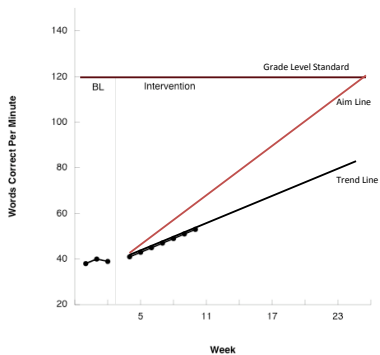
Assumption 2: Decision Makers Have Skills and Supports to Base Decisions on Data

- Fischer, et al., (2003)
 - Evaluated effects of training and visual aids on accuracy of visual inspection.
 - ❑ Interpretation accuracy increased from 55% to 94% with full training.
 - ❑ Interpretation accuracy increased from 71% to 95% with brief (15 minute training) and visual aids.

Assumption 2: Decision Makers Have Skills and Supports to Base Decisions on Data

- Stecker, Fuchs, & Fuchs (2008)
 - Teachers increased accuracy of interpreting CBM data when:
 - ❑ trained to interpret graphs
 - ❑ graphical judgment aids incorporated into data-display
 - ❑ decision rules provided
 - ❑ computer assisted graphing and data analysis

Visual Aids Can Enhance Data Interpretation



Assumption 2: Decision Makers Have Skills and Supports to Base Decisions on Data

- Codding, Skowron, & Pace (2005)
 - Teachers implemented CBM decision-making protocols only after training:
 - Modeling
 - Practice
 - Performance feedback

Assumption 2: Decision Makers Have Skills and Supports to Base Decisions on Data

- Bartels & Mortenson (2005)
 - Compliance with problem-solving protocol improved only with feedback and checklist.

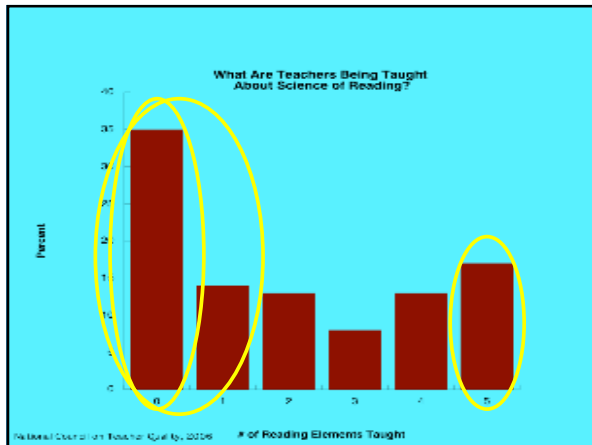
Assumption 2: Decision Makers Have Skills and Supports to Base Decisions on Data

- Assumption valid under certain conditions:
 - decision-makers trained to interpret graphic display.
 - graphical judgment aids are provided for data interpretation.
 - explicit training and feedback provided for following decision-making protocols.

Take home message: System must be in place to support decision making.

Assumption 3: Decision Makers Know What to Do When a Problem is Identified

- Knowing there is a problem and knowing what to do about it are very different things.
- It is not clear that we are preparing educators to identify and implement evidence-based interventions.



Are We Training Educators to Know What to Do?

Survey of School Psychology Directors of Training

(Shernoff, Kratochwill, & Stoiber, 2003)

Evidence-based interventions

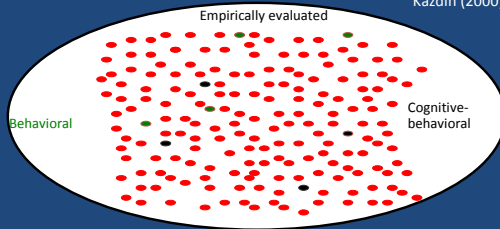
29% directors ~~Knowledge~~

41% programs ~~Training~~

Are We Training Educators to Know What to Do?

550 named interventions for children and adolescents

Kazdin (2000)



Evidence-based interventions are less likely to be used than interventions for which there is no evidence or there is evidence about lack of impact.

Sources of Information for Practitioners

- Journals
 - Practitioners spend about 1 hour/week reading research.
 - Often practitioners are not trained to evaluate research.
- Internet
 - Quality of information unreliable.
- Supervisors/Colleagues
 - Not necessarily informed about research base.

Sources of Information for Practitioners

- Evidence-based Clearinghouses
 - What Works Clearinghouse
 - ☐ Addresses primarily academic issues
 - ☐ Rigorous standards
 - ✓ Relatively few research-based interventions meet standards.
 - ✓ Currently does not evaluate single subject research.
 - ☐ Practice guides are good resource.
 - National Autism Center
 - ☐ Guidance only for students on Autism Spectrum.
 - Best Evidence Encyclopedia

Sources of Information for Practitioners

- Best Practice Guidelines
 - Intended to inform consumers and service providers about **optimal care** guidelines as compared to generally accepted practice for conditions or disorders (Romanczyk 2008)
 - ❑ Guidelines set a higher standard for care.
 - ❑ Many groups purport to having BP guidelines but they fail to follow accepted methodology for evaluating treatments.
 - ✓ Systematic review of literature; experts base recommendations on literature and expand to more general guidelines for practice.
 - ✓ The "gold standard" for Best Practice Guidelines

Sources of Information for Practitioners

- Research-based Principles
 - Function of Principles in Practice
 - ❑ Create Individualized Interventions
 - ❑ Adapt Interventions

Basic Principles of Behavior

- Reinforcement
- Punishment
- Extinction

Principles and Tactics of Intervention

- Shaping
- Chaining
- Prompting
- Differential reinforcement
- Functional assessment
- Monitoring through direct measurement
- Providing immediate feedback
- Increasing number of opportunities to respond

Assumption 3: Decision Makers Know What to Do When a Problem is Identified.

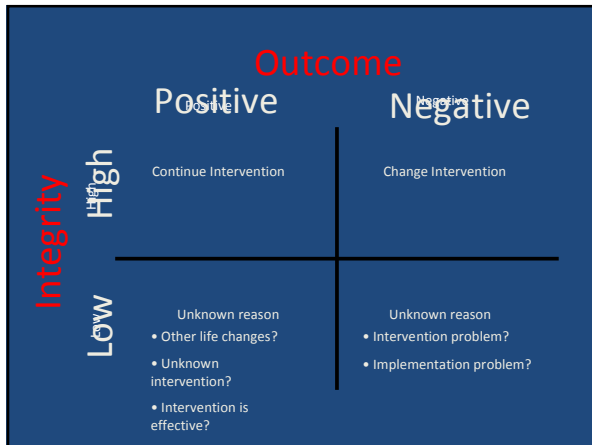
- Validity of this assumption is tenuous.
- Training programs are often failing.
- Evidence-based clearinghouses are becoming better sources of information.
 - Considerable work to be done.

Assumption 4: Adequate skills, supports, and resources to implement with integrity.

- The effectiveness of interventions is a function of the integrity with which they are implemented.
- The quality of decisions regarding an intervention is directly linked with the integrity of implementation.

Assumption 4: Adequate skills, supports, and resources to implement with integrity

- Estimated that evidence-based drug prevention programs are implemented with integrity only 19% of the time. (Hallfors & Godette, 2002)
 - This may be a generous estimate.
- No reason to assume that PBS is immune to poor implementation.



Facilitating Treatment Integrity

- Contextual fit
- On-going technical assistance
- Resources available
 - materials
 - staff
 - time
- Systematic monitoring of integrity

Effects of Training			
TRAINING COMPONENTS	OUTCOMES (% of Participants who demonstrate knowledge, demonstrate new skills in a training setting, and use new skills in the classroom)		
	Knowledge	Skill Demonstration	Use in the Classroom
Theory and Discussion	10%	5%	0%
...+Demonstration in Training	30%	20%	0%
...+ Practice & Feedback in Training	60%	60%	5%
...+ Coaching in Classroom	95%	95%	95%

Joyce and Showers, 2002

Assumption 4: Adequate skills, supports, and resources to implement with integrity

- Assumption true only when a system in place to actively promote and facilitate treatment integrity.
 - Poor treatment integrity is common across both academic and social interventions.
 - It is common for systems to invest very few resources in assuring treatment integrity.

Determining the Impact

Additive		Multiplicative	
Data reliable and valid	+	Data reliable and valid	+
Decision makers have necessary skills	+	Decision makers have necessary skills	+
Decision makers know what to do	+	Decision makers know what to do	+
Interventions implemented with integrity	-	Interventions implemented with integrity	0
Score	3/4	Score	0

Summary

- Data-based decision making offers great promise for assuring educational benefit for all students.
- To realize promise requires a culture that supports data-based decision making.
 - Primary function of all elements of a system are defined as enhancing student outcomes.
- Comprehensive system is required.

Thank you
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