Measurement, Data Display, and Interpretation

Behavior analyst certification examination

12 tasks · 21 questions on the exam · BACB Test Content Outline (6th ed.)

This area covers how behavior is defined, measured, checked, graphed and read: operational definitions, measures of occurrence and time, continuous and discontinuous procedures, efficiency, validity and reliability, choosing a measure, graphing and visual analysis, and measuring procedural integrity. Questions usually give a behavior and a setting and ask for the best measure, the error a procedure will introduce, the right IOA formula, or what a graph shows.

You should be able to: Given a behavior, a setting and a question, you should be able to write its operational definition, choose and design the measure that captures its critical dimension, compute and judge IOA and integrity data, and read level, trend and variability on a graph.

Every task: the key point and the trap

C.1 Create operational definitions of behavior.

An operational definition describes a target behavior in observable, measurable terms so that two observers would agree on every occurrence; it says what the person does, not what they are or feel.

Trap: A definition that names an inner state or a label (angry, defiant, upset) is not operational, however detailed the rest of it is.

C.2 Distinguish among direct, indirect, and product measures of behavior.

Direct measurement records the behavior itself, at the time and place it occurs, as the target behavior (observing and counting hand raises in class).

Trap: A permanent product is still a measure of the behavior's real effect, recorded after the fact; a report or rating of behavior is indirect, even if completed by someone who saw it.

C.3 Measure occurrence.

Count is the simple tally of the number of responses observed; it is meaningful only when the observation time is held constant or reported with it.

Trap: Comparing counts from observations of different lengths is invalid; convert to rate when observation periods differ.

C.4 Measure temporal dimensions of behavior (e.g., duration, latency, interresponse time).

Duration is the amount of time from the onset to the offset of a response; it can be reported as total duration per session or as duration per occurrence.

Trap: Latency starts at the antecedent stimulus and ends at the start of the response; IRT starts at the end of one response and ends at the start of the next.

C.5 Distinguish between continuous and discontinuous measurement procedures.

Continuous measurement detects every instance of the behavior during the observation period: event recording (count, rate), duration, latency and IRT.

Trap: Interval and time sampling data are estimates expressed as a percentage of intervals; they are not counts of the behavior and cannot be converted back into true rate or duration.

C.6 Design and apply discontinuous measurement procedures (e.g., interval recording, time sampling).

Whole-interval recording: the observation is divided into equal intervals and the behavior is scored only if it occurs throughout the entire interval; it tends to underestimate occurrence and suits behaviors you want to increase that should be continuous, such as on-task behavior.

Trap: Partial-interval recording overestimates and whole-interval recording underestimates; choose the method whose bias works against showing false improvement for the behavior's direction of change.

C.7 Measure efficiency (e.g., trials to criterion, cost-benefit analysis, training duration).

Efficiency measures describe how quickly and at what cost a skill is learned or an intervention produces results, beyond whether it works at all.

Trap: An intervention can be effective without being efficient; efficiency is about the trials, time or resources needed to reach the same outcome.

C.8 Evaluate the validity and reliability of measurement procedures.

Validity: the data measure what they are intended to measure, a socially significant behavior and the dimension of it relevant to the question. Threats include measuring a proxy instead of the behavior, measuring the wrong dimension, and measuring at the wrong times or places.

Trap: High IOA shows that two observers agree, not that either recorded the behavior accurately, and total count IOA can be high even when the observers scored different occurrences.

C.9 Select a measurement procedure to obtain representative data that accounts for the critical dimension of the behavior and environmental constraints.

Start with the question: which dimension of the behavior is socially significant (how often, how long, how quickly, how much, how well, where)?

Trap: The best measure is the one that captures the dimension of concern under the real constraints, not the most precise or most common measure.

C.10 Graph data to communicate relevant quantitative relations (e.g., equal-interval graphs, bar graphs, cumulative records).

The equal-interval line graph is the most common display in applied work: equal distances on each axis represent equal amounts, the horizontal axis shows time or sessions, the vertical axis the behavior, and phase change lines separate conditions with data paths not connected across them.

Trap: On a cumulative record, a flat segment means no responding, not steady responding; rate is shown by the slope, not the height.

C.11 Interpret graphed data.

Visual analysis looks at three properties within each condition: level (the value on the vertical axis around which data converge, often a mean or median), trend (the overall direction and steepness of the data path) and variability (how much the data points differ from one another).

Trap: A baseline that is already moving in the therapeutic direction makes an intervention effect uninterpretable, even if the intervention phase looks good.

C.12 Select a measurement procedure to obtain representative procedural integrity data that accounts for relevant dimensions (e.g., accuracy, dosage) and environmental constraints.

Procedural (treatment) integrity is the extent to which the independent variable is implemented as planned; without it, outcomes cannot be attributed to the intervention.

Trap: Integrity data measure the implementer's behavior, not the client's; good client outcomes do not show the procedure was implemented as written.

Key terms

Operational definition: A description of behavior in observable, measurable terms that observers can agree on.

Rate: Count of responses per unit of observation time.

Celeration: The change in rate of responding over time.

Latency: Time from the onset of a stimulus to the start of the response.

Interresponse time: Time between the end of one response and the start of the next.

Whole-interval recording: Scoring an interval only if the behavior occurred throughout it; tends to underestimate.

Partial-interval recording: Scoring an interval if the behavior occurred at any time in it; tends to overestimate.

Momentary time sampling: Scoring whether the behavior is occurring at the moment each interval ends.

Permanent product: A lasting effect of behavior on the environment, measured after the behavior has occurred.

Interobserver agreement: The degree to which independent observers report the same measured values.

Observer drift: Unintended change over time in how an observer applies a definition.

Reactivity: Change in behavior caused by the person knowing they are being observed.

Cumulative record: A graph of responses summed over time, in which slope shows rate.

Procedural integrity: The extent to which an intervention is implemented as designed.

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