ESTABLISHING OPERATION

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Establishing Operations (EOs) in Behavior Analysis

The Core Definition of Establishing Operations

Establishing Operations (EOs) represent a crucial concept within the field of Behavior Analysis, functioning as environmental events that fundamentally alter the effectiveness of a stimulus as a reinforcer or punisher, and simultaneously alter the frequency of behavior that has been previously associated with that stimulus. Initially defined as a subcategory of motivating variables, the term EO is often used interchangeably with the broader, modern conceptualization known as Motivating Operations (MOs). The essence of an EO lies in its dual effects: it changes the value of a consequence (the outcome of behavior) and evokes or suppresses the behavior necessary to achieve that consequence. This concept moves beyond the simple stimulus-response model by incorporating internal or environmental variables that determine the *need* or *desire* for a specific outcome, thus providing a deeper understanding of behavioral motivation.

The definition emphasizes that EOs are antecedent events, meaning they occur before the behavior itself, setting the stage for subsequent actions. Consider the example of water: under normal circumstances, water has a mild reinforcing value. However, after intense physical exertion or several hours of water deprivation, the value of water as a reinforcer increases dramatically. This deprivation state is the Establishing Operation. Furthermore, this EO also immediately increases behaviors associated with obtaining water, such as seeking a faucet or purchasing a drink. Without understanding this shift in motivational state, predicting or controlling complex human behavior becomes significantly more challenging, highlighting why the EO concept is indispensable for practitioners working in clinical settings.

EOs can be categorized as positive or negative. A **Positive Establishing Operation (PEO)**, such as the aforementioned water deprivation, increases the reinforcing effectiveness of a stimulus (water) and increases the frequency of the relevant behavior (drinking). Conversely, an **Abolishing Operation (AO)**--a term often grouped under the MO umbrella but conceptually opposite to the EO--decreases the reinforcing effectiveness of a stimulus and reduces the frequency of the relevant behavior. For instance, being completely satiated after a large meal acts as an AO for food, making food consumption less likely and reducing the reinforcing value of culinary stimuli. The distinction between establishing and abolishing effects allows analysts to precisely identify the environmental variables that either promote or inhibit specific behaviors.

Historical Development and Conceptual Origins

The formal conceptualization of the Establishing Operation emerged relatively late in the history of behaviorism, growing out of the need to address motivational variables that B.F. Skinner's initial three-term contingency (Antecedent-Behavior-Consequence) did not fully explain. While Skinner

acknowledged motivating variables, they were often treated implicitly or grouped loosely with discriminative stimuli. The need for a dedicated motivational construct became evident when analysts observed that a stimulus might function as a reinforcer on one occasion but not on another, even if the discriminative stimulus remained constant. This variability suggested a missing component that influenced the organism's internal state or environment.

The term **Establishing Operation** was formally introduced by Jack Michael in 1982, and later elaborated upon by him and his colleagues, notably in the late 1980s and early 1990s. Michael recognized that environmental events must not only signal the availability of reinforcement (the function of a discriminative stimulus) but must also change the individual's motivation to seek that reinforcement. Michael's seminal work provided a rigorous, behavioral definition for these motivational variables, allowing them to be studied, manipulated, and operationalized with the same scientific precision applied to other behavioral concepts. This development marked a significant advancement, bridging gaps between basic research in the experimental analysis of behavior and its practical application in clinical settings.

The transition from the term EO to the more inclusive term Motivating Operation (MO) reflects subsequent refinements in the scientific community. While EO focuses specifically on *increasing* the value of a reinforcer, the MO framework encompasses both value-increasing (Establishing) and value-decreasing (Abolishing) effects. This evolution has solidified MOs as one of the most important theoretical developments in modern Behavior Analysis, providing a comprehensive framework for analyzing why an organism chooses to engage in a particular operant behavior at a specific time, even when the environment appears identical to a previous non-response situation.

The Dual Functions of Establishing Operations

The primary importance of the EO concept rests in its two distinct, yet simultaneous, effects on behavior and consequence effectiveness. These are universally described as the **Value-Altering Effect** and the **Behavior-Altering Effect**. The value-altering effect dictates the attractiveness or repulsiveness of a specific consequence. For example, if an individual has not slept for 48 hours (the EO), the value of sleep as a reinforcer is immensely increased. Conversely, if an individual has just finished a 10-hour nap, the value of sleep is drastically reduced. This alteration in reinforcing value is the prerequisite for the second effect to take hold.

The behavior-altering effect, also known as the **evocative effect**, refers to the immediate change in the frequency of the specific behavior that has historically been reinforced by that altered consequence. When the effectiveness of sleep is established (value-altering effect), the individual will immediately begin engaging in behaviors that procure sleep, such as lying down, turning off the lights, or canceling appointments (behavior-altering effect). It is crucial to note that EOs do not function as discriminative stimuli (SDs); SDs signal the *availability* of a reinforcer, whereas EOs

change the *desirability* or *efficacy* of the reinforcer itself. An EO momentarily increases the response frequency, even if the reinforcement is not currently available, simply because the motivating condition is present.

Understanding the distinction between these two functions is vital for behavioral intervention. If a practitioner only focuses on the behavior (e.g., stopping a child's tantrum), they might miss the underlying motivational variable (the EO). By identifying and manipulating the EO--for example, ensuring a child is not deprived of attention before a challenging task--the practitioner can preemptively reduce the effectiveness of the consequence (attention gained through a tantrum) and, consequently, reduce the motivated behavior itself. Furthermore, EOs can modify the effectiveness of existing operants, create new operants by bringing previously ineffective consequences into play, and even serve as conditional stimuli that set up future motivational states.

A Practical Illustration: Deprivation and Reinforcement Efficacy

To fully grasp the mechanism of an Establishing Operation, consider a common scenario involving social interaction and attention, a powerful class of reinforcers. Imagine a scenario involving a child, Leo, who frequently calls out aggressively during class time. This behavior is maintained because the teacher often responds to quiet him down, thereby providing attention (the reinforcer).

The core EO in this scenario is likely **Attention Deprivation**. If Leo spends the morning engaged in independent tasks with minimal teacher interaction, the EO of attention deprivation is established. This state of low social contact acts as a Positive Establishing Operation, increasing the reinforcing value of teacher attention. The immediate consequence is the Behavior-Altering Effect: Leo begins to call out aggressively because, historically, that specific operant behavior has been successful in accessing the now highly valued consequence (teacher attention). The intensity and frequency of the disruptive behavior are momentarily increased because the motivational state is high.

The Antecedent Environment: Leo is seated quietly, but has had limited social interaction for 30 minutes. This lack of interaction is the environmental event.

The Establishing Operation (EO): The prolonged period without attention creates a state of **Attention Deprivation**.

Value-Altering Effect: The value of teacher attention as a reinforcer is sharply increased.

Behavior-Altering Effect: Leo engages in the established behavior (calling out) at a high frequency, as this behavior has previously secured the now highly valued attention.

The Consequence: The teacher reprimands Leo (providing attention), reinforcing the calling-out

behavior, thus completing the motivational cycle and ensuring the behavior is likely to occur again when the EO is present.

Conversely, if the teacher proactively provided frequent, non-contingent attention (e.g., checking in every five minutes for positive reinforcement), this would act as an **Abolishing Operation (AO)**. The AO would decrease the child's deprivation state, reduce the reinforcing value of additional attention, and consequently decrease the frequency of the aggressive calling-out behavior.

Significance and Applications in Applied Behavior Analysis (ABA)

The concept of the Establishing Operation is paramount in Applied Behavior Analysis (ABA) because it provides a mechanism for understanding and manipulating the context of behavior, not just the behavior itself. Before the formal articulation of EOs/MOs, interventions often focused solely on consequences (reinforcement and punishment). While effective, these methods were reactive. By incorporating EOs, practitioners can become proactive, manipulating the environment to prevent undesirable behavior from being motivated in the first place. This leads to more ethical, efficient, and durable behavior change.

One of the most critical applications is in **Functional Behavior Assessment (FBA)**. When analyzing challenging behaviors, analysts must determine the "function" or purpose of the behavior (e.g., escape, attention, tangible access). However, the FBA is incomplete without identifying the antecedent conditions--the EOs--that make that function relevant at that time. For instance, if a functional analysis shows a child bites their hand for escape, the EO might be the presentation of a highly demanding task coupled with lack of sleep. By identifying the EO (sleep deprivation and task demand), practitioners can implement "antecedent manipulations," such as ensuring adequate rest and breaking tasks into smaller, less demanding segments, thereby abolishing the motivation to escape.

Furthermore, EOs are essential in teaching new skills. If a therapist is trying to teach a learner to request an item (a communication skill), the learner must first be motivated to obtain that item. The therapist must therefore create a Positive Establishing Operation--perhaps by restricting access to a preferred toy (deprivation)--thereby maximizing the reinforcing value of the toy. Only when the EO is high will the learner be motivated to engage in the effortful new behavior (the request). This strategic use of EOs ensures that the teaching environment is maximally effective, accelerating skill acquisition across communication, social, and academic domains.

Connections to Related Behavioral Concepts

Establishing Operations belong squarely within the subfield of **Behaviorism**, specifically the experimental and applied branches of Behavior Analysis. Their primary relationship is with the **Three-Term Contingency** (Antecedent, Behavior, Consequence, or A-B-C), which forms the basic

unit of analysis for operant behavior. The EO functions as a fourth, contextual term that precedes and modifies the entire A-B-C sequence.

The most common point of confusion for new students is distinguishing between an EO (or MO) and a **Discriminative Stimulus (SD)**. While both are antecedent events, their functions are fundamentally different. The SD is a stimulus that signals the *contingency* is in effect--that reinforcement is available if the behavior occurs. For example, a "Closed" sign is an SD that signals that entering the store will *not* be reinforced. Conversely, the EO changes the *effectiveness* of the reinforcer itself, regardless of its availability. For example, extreme hunger (EO) will make food highly desirable, but the presence of a restaurant sign (SD) tells the hungry person where the food is available. The EO makes the person want food; the SD tells them how to get it.

The modern term Motivating Operation has been further refined into two major types: **Unconditioned Motivating Operations (UMOs)** and **Conditioned Motivating Operations (CMOs)**. UMOs are inherent and unlearned, such as deprivation of food, water, or sleep, or exposure to extreme temperatures. These naturally alter the reinforcing effectiveness of their corresponding consequences. CMOs, on the other hand, are learned; they acquire their motivational altering effects through pairing with other EOs or reinforcement histories. For example, a locked door (a neutral stimulus) might become a CMO for asking for a key, because being locked out has been paired with the primary EO of restricted access to a desired environment. Understanding these categories allows for increasingly sophisticated analyses of complex human motivation, including social behavior, language, and persistence toward long-term goals.