

EASTERBROOK HYPOTHESIS

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Primary Disciplinary Field(s): Cognitive Psychology, Experimental Psychology, Human Factors, Performance Psychology

Proponents: Donald A. Easterbrook (1959)

1. Core Principles: Arousal and Cue Utilization

The Easterbrook Hypothesis posits an inverse relationship between the level of physiological or psychological **arousal** experienced by an individual and the range of environmental **cues** that individual can effectively attend to or utilize. Simply stated, as arousal increases, the field of attention narrows. This concept fundamentally links an individual's internal state--specifically, their level of excitement or stress--to their ability to perceive and process information from the external world. The hypothesis is central to understanding how emotional states impact cognitive processes, particularly in high-stakes situations where optimal information processing is crucial for successful task performance. The primary implication is that while moderate arousal might lead to beneficial focusing, excessively high arousal causes a detrimental narrowing that excludes necessary peripheral information.

The theory relies heavily on the differentiation between **central cues** and **peripheral cues**. Central cues are those deemed most relevant or important for the successful execution of the immediate task, while peripheral cues are secondary stimuli situated outside the immediate focus, often providing contextual or supplementary information. According to Easterbrook, when arousal is low, attention is broad, and both central and peripheral cues are processed. As arousal rises, the cognitive system begins to selectively inhibit the processing of peripheral cues, focusing energy almost exclusively on the central cues. This selectivity is generally adaptive up to a certain point, ensuring the most vital information is prioritized under pressure. However, the critical phase occurs when arousal becomes so extreme that the attentional field shrinks excessively, potentially excluding even crucial information that was incorrectly categorized as peripheral, leading to performance decrements.

Easterbrook's formulation provides a specific, measurable mechanism for understanding how heightened emotional states affect behavior, moving beyond general statements about stress and performance. The strength of the hypothesis lies in its predictive power regarding what information an individual is likely to miss under stress. For instance, a driver experiencing high anxiety following a near-miss might focus intensely on the car immediately ahead (a central cue) but completely fail to notice a pedestrian approaching from the side (a critical peripheral cue). Therefore, the concept of **cue utilization**--the efficiency with which environmental stimuli are incorporated into decision-making--becomes the primary dependent variable modulated by arousal levels.

2. Historical Context and Origin

The Easterbrook Hypothesis was formally introduced by psychologist Donald A. Easterbrook in his seminal 1959 paper, "The effect of emotion on cue utilization and the organization of behavior," published in the *Psychological Review*. This work emerged during a period of intense psychological interest in the relationship between physiological activation (arousal) and behavioral output, a field largely dominated by drive theory and the emerging recognition of the complexity of emotional influence on cognition. Easterbrook sought to refine existing models by providing a cognitive mechanism--attentional selection--to explain why performance often declines under extreme pressure, a phenomenon that could not be fully accounted for by simple linear drive models.

Before Easterbrook, models like the Hull-Spence Drive Theory suggested that arousal generally multiplied existing habits or response tendencies. While this explained improved performance on simple, dominant tasks, it struggled to explain why complex tasks often suffered under high arousal. Easterbrook integrated the concept of arousal with information processing theory, suggesting that arousal does not merely amplify responses but actively modifies the input stage--that is, what information is even registered by the organism. His 1959 model provided a cognitive filter, positing that emotion acts as a gatekeeper for sensory information, thus offering a critical bridge between emotion research and cognitive science.

The immediate predecessor and critical context for the hypothesis is the Yerkes-Dodson Law, established decades earlier. The Yerkes-Dodson Law describes an inverted-U relationship between arousal and performance: performance increases with arousal up to an optimal point, after which it declines. Crucially, Easterbrook's work provided the most compelling cognitive explanation for the descending limb of this curve--the region where excessive arousal leads to performance failure. He argued that the decline occurs precisely because the attentional field narrows so severely that necessary information for task completion is ignored, thus transforming the generalized observation of the inverted-U into a specific, testable prediction about selective attention.

3. The Mechanism of Attentional Narrowing

The process of attentional narrowing described by Easterbrook is hypothesized to be a biologically protective mechanism, an evolutionary adaptation designed to prioritize survival-critical stimuli during moments of threat or extreme stress. When the sympathetic nervous system is highly activated, resources--both physiological and cognitive--are diverted away from processing non-essential information and channeled towards reacting to the immediate threat. This shift manifests cognitively as a restriction of the perceptual field, leading to the well-known phenomenon often termed "tunnel vision" or "weapon focus" in forensic psychology.

The selection process under high arousal is thought to be driven by learned relevance and salience. Highly aroused individuals tend to attend only to stimuli that have a high probability of being the cause of the arousal or that are strongly associated with the required response. For example, in a competitive sporting event, a highly aroused athlete focuses intensely on the ball or the immediate opponent (central cues) while ignoring the crowd noise or changes in weather conditions (peripheral cues). While this sharp focus often leads to momentary excellence in highly practiced, simple skills, it compromises performance in tasks requiring a broader assessment of the environment, flexible strategy formation, or detection of unexpected dangers.

Furthermore, contemporary cognitive research has suggested that this narrowing might be linked to the prefrontal cortex's ability to maintain working memory and executive control under stress. High arousal levels flood the system with stress hormones (like cortisol and norepinephrine), which can impair the efficiency of executive functions necessary for effective cognitive switching and broad environmental scanning. Thus, attentional narrowing may not be a deliberate choice but an unavoidable consequence of resource depletion or functional impairment in the brain's filtering mechanisms under severe stress, making it difficult to shift focus away from the dominant, central stimulus, even if that focus proves detrimental in the long run.

4. Relationship to the Yerkes-Dodson Law

The Easterbrook Hypothesis serves as a crucial explanatory adjunct to the classical Yerkes-Dodson Law. The Yerkes-Dodson Law predicts optimal performance at moderate arousal levels. Easterbrook's contribution is detailing **why** performance declines at the extremes of the arousal continuum, particularly the high end. At low arousal, attention is too diffuse, leading to distraction and inclusion of irrelevant cues, hence suboptimal performance. As arousal increases to the optimal zone, attentional focus tightens just enough to exclude most irrelevant peripheral cues, optimizing resource allocation for the central task, resulting in peak performance.

However, the continuation of the arousal increase beyond this optimum pushes the cue utilization range into a maladaptive state. In this high-arousal zone, the narrowing becomes excessive, leading to the exclusion of cues that are actually relevant or necessary for the successful completion of the complex task. This mechanism explains the complexity dependence observed in the Yerkes-Dodson curve: simple tasks (which have few necessary central cues) are less affected by attentional narrowing and may tolerate higher levels of arousal, whereas complex tasks (which rely on many cues, some of which are peripheral) suffer steep performance drops due to the loss of vital information.

Therefore, the integration of these two concepts provides a robust framework: the Yerkes-Dodson Law describes the performance outcome (the inverted-U curve), and the Easterbrook Hypothesis provides the cognitive mechanism (cue utilization) driving that outcome. Performance decline is

fundamentally a function of informational loss--the failure to utilize the full range of necessary sensory input--caused by the extreme physiological state of high arousal. Understanding this link is vital in fields ranging from educational testing to athletic training, allowing practitioners to aim for the optimal arousal level that facilitates appropriate, rather than overly narrow, attention.

5. Experimental Paradigms and Evidence

Empirical support for the Easterbrook Hypothesis has historically relied on experimental designs that manipulate arousal while measuring the ability to perceive peripheral information during a primary, central task. A typical paradigm involves participants completing a demanding primary task (e.g., tracking a central object) under varying levels of induced stress or arousal (e.g., time pressure, noise, mild electric shock, or physical exertion). Simultaneously, researchers measure the detection or recognition of secondary, peripheral stimuli (cues presented far outside the central focus).

Classic findings generally support the hypothesis: participants in high-arousal conditions demonstrate significantly impaired recall or recognition of peripheral cues compared to those in low-arousal or moderate-arousal conditions, even while performance on the central task may be maintained or temporarily enhanced. This trade-off between central and peripheral processing is the hallmark evidence for attentional narrowing. For example, studies in vigilance and simulated driving often show that highly stressed participants are less likely to notice environmental changes or hazard warnings presented outside their direct line of focus.

One of the most compelling examples of this narrowing effect is seen in the phenomenon of "weapon focus" in eyewitness testimony. Research shows that witnesses to a crime, particularly those exposed to high threat, tend to focus their attention intensely on the threatening object (e.g., a weapon), which is a crucial central cue. This extreme focus comes at the expense of processing peripheral information, leading to impoverished memory for details such as the perpetrator's clothing, height, or characteristics of the surrounding environment. This real-world application validates the core assertion that high emotional arousal dramatically restricts the scope of perception and memory encoding.

6. Key Concepts and Components

Arousal Level: Refers to the degree of physiological and psychological activation, typically measured through autonomic indicators such as heart rate, skin conductance, or subjective self-report scales. The hypothesis predicts that high levels of arousal, whether positive or negative (e.g., intense excitement or severe anxiety), will uniformly lead to attentional narrowing.

Cue Utilization: This component describes the effective intake and processing of sensory information from the environment. Low cue utilization means that potentially relevant information is

being ignored or filtered out. The hypothesis equates decreased cue utilization directly with increased arousal.

Central Cues: Stimuli that are immediately relevant and salient to the primary task at hand. These cues are prioritized and enhanced under conditions of moderate to high arousal, leading to highly focused attention.

Peripheral Cues: Stimuli that are less immediate or directly relevant to the core task, often providing background context or supplementary data. These cues are the first to be excluded or inhibited as arousal levels rise, demonstrating the narrowing of the attentional field.

Attentional Narrowing (or Tunneling): The observable cognitive restriction of the scope of attention. It is the defining process described by the hypothesis, resulting in an individual processing fewer incoming environmental stimuli as their internal state of activation increases.

7. Applications in High-Stress Environments

The Easterbrook Hypothesis holds profound significance for fields dedicated to optimizing human performance under duress, such as military psychology, aviation safety, surgical training, and competitive athletics. Understanding that heightened stress inevitably leads to attentional narrowing allows designers and trainers to mitigate potential failure points. For instance, in aviation, cockpit instrument panels are designed to place the most critical information centrally, recognizing that pilots under high stress during emergencies are prone to ignoring peripheral indicators. Training protocols often incorporate high-fidelity simulations that deliberately introduce stressors to help individuals practice broad environmental scanning even when highly aroused.

In military and law enforcement contexts, the hypothesis explains why officers might experience perceptual distortions--failing to see secondary threats or bystanders--during high-speed pursuits or critical incident responses. Training programs in these fields often emphasize mindfulness and controlled breathing techniques designed specifically to reduce excessive arousal back into the optimal zone, thereby preserving the cognitive capacity for utilizing a wider range of threat cues necessary for situational awareness. The goal is not to eliminate arousal, but to manage it so that the narrowing effect is adaptive rather than destructive.

Furthermore, in sports psychology, the theory helps explain choking under pressure. When an athlete becomes overly focused due to excessive pre-competition anxiety, their attention narrows intensely to the mechanics of their immediate action (a central cue) or internal worries, causing them to neglect critical peripheral cues like opponent positioning, wind conditions, or necessary shifts in strategy. Coaches frequently use relaxation techniques and mental imagery to ensure athletes maintain moderate, optimal arousal, thereby preventing detrimental attentional tunneling that compromises complex decision-making required for peak performance.

8. Criticisms, Refinements, and Alternative Models

Despite its widespread influence and empirical support, the Easterbrook Hypothesis has faced several conceptual and methodological criticisms over the decades. A primary challenge lies in the difficulty of precisely defining and measuring **arousal**. Arousal is a complex, multi-dimensional construct (including physiological, cognitive, and affective components), and researchers often use different measures (e.g., heart rate vs. self-reported anxiety), which sometimes yield inconsistent results. Furthermore, critics argue that the hypothesis oversimplifies the relationship by treating all types of arousal--whether excitement or fear--as functionally equivalent in their effect on attention.

A significant theoretical refinement focuses on the distinction between the **breadth** of attention and the **selectivity** of attention. Some alternative models, such as the Processing Efficiency Theory (PET) proposed by Eysenck and Calvo, suggest that anxiety primarily impairs the efficiency of cognitive processing (the resources used) rather than necessarily reducing the breadth of the attentional field (the scope of information intake). While performance may suffer, PET suggests this is due to high-anxiety individuals diverting cognitive resources to worry and self-monitoring, which consumes working memory, rather than solely failing to register peripheral cues.

Finally, researchers have explored whether attentional narrowing is truly an involuntary response to arousal or a voluntary, strategic adjustment. While extreme arousal likely forces narrowing, moderate arousal may allow individuals to strategically narrow their focus on highly relevant information, thus improving performance in controlled settings. These debates have led to more nuanced contemporary models of attention and performance, such as Neurobiological Models of Stress Response, which integrate specific brain circuits (e.g., the amygdala and prefrontal cortex) to explain the complex, context-dependent nature of how stress modifies perceptual input and cognitive control, often building upon, rather than discarding, Easterbrook's foundational insight into cue utilization.

Further Reading

[Easterbrook hypothesis \(General Overview\)](#)

[Easterbrook, J. A. \(1959\). The effect of emotion on cue utilization and the organization of behavior. Psychological Review.](#)

[Yerkes-Dodson law \(Contextual Theory\)](#)