ERROR OF COMMISSION

Authored by

Mohammed looti

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Definition and Core Mechanism

The Error of Commission is a critical concept within Cognitive Psychology and human factors research, referring specifically to a mistake that occurs when an action is taken, but that action is either incorrect, unnecessary, or executed improperly, resulting in a negative or unintended outcome. Fundamentally, it is an error of **doing** rather than an error of failing to do. This type of error contrasts sharply with its counterpart, the error of omission, where the necessary action is simply neglected or forgotten. The core mechanism involves a breakdown in the executive functions responsible for planning, monitoring, and inhibiting inappropriate responses. When an individual commits an error of commission, they have typically misinterpreted a situation, misapplied a rule, or failed to adequately inhibit a prepotent but ultimately incorrect response. This active failure often requires a considerable amount of cognitive effort, distinguishing it from passive failures associated with inattention or simple forgetting.

Expanding on this definition, an Error of Commission is not just a random mistake; it is frequently rooted in systematic failures of information processing. For instance, an individual might possess the correct knowledge and intention but execute a faulty sequence of steps or choose the wrong option from a selection set. These errors are often categorized based on the level of cognitive processing involved: **skill-based slips** (automatic, rapid errors due to attention lapses), **rule-based mistakes** (applying the wrong rule to a familiar situation), or **knowledge-based mistakes** (poor interpretation of novel situations). Regardless of the specific categorization, the defining feature remains the active involvement of the agent in performing the faulty behavior. Understanding the dynamics of these active errors is crucial because they often carry higher risks in complex systems, such as aviation, medicine, and industrial control, where the initiation of an incorrect action can have immediate and catastrophic consequences, necessitating robust checks and balances to prevent them.

Distinguishing Errors of Commission from Omission

To fully grasp the nature of the Error of Commission, it is essential to delineate its boundaries from the Error of Omission. The Error of Omission is characterized by passive failure--the absence of a required action. If a pilot forgets to lower the landing gear, that is an omission, representing a lapse of memory or attention. Conversely, if the pilot intentionally lowers the landing gear too early or too late, or attempts to engage a completely irrelevant control sequence while focused on landing, that constitutes a commission. This distinction is vital for analyzing incident reports and designing effective intervention strategies. Omissions frequently stem from attentional lapses, memory failure, or distractions that prevent necessary steps from being initiated, often requiring reminders or checklists as countermeasures.

Errors of commission, however, usually involve a different set of cognitive culprits, primarily related to active decision-making under pressure or ambiguity. The individual is actively engaged in the task but selects an incorrect path. For example, in a medical setting, administering the wrong drug is a commission, while failing to administer a necessary drug is an omission. Researchers in Human Factors emphasize that while both types of errors are detrimental, commissions often reveal more about systemic flaws in training, interface design, or procedural complexity, as the agent was actively trying to follow a system that ultimately guided them toward the wrong output. The mechanism of **inhibition** is key here; the correct response was likely available, but the cognitive system failed to inhibit the execution of the erroneous, dominant, or otherwise accessible response, leading to a deliberate but flawed action.

Historical and Cognitive Roots

The systematic study of human error, which encompasses the Error of Commission, gained significant traction following World War II, driven by the increasing complexity of technological systems, particularly in military and industrial contexts. Pioneers in the field, particularly those associated with the emerging discipline of Cognitive Psychology, began moving away from purely behavioral explanations toward models that focused on internal mental processes such as perception, memory, and executive function. A key figure in formalizing the taxonomy of human error was James Reason, whose seminal work in the 1980s provided a foundational framework for distinguishing between different types of slips, lapses, and mistakes. Reason's classification, often referred to as the "Generic Error Modeling System" (GEMS), positioned commission errors firmly within the categories of slips (failure in execution) and mistakes (failure in planning or intention), providing a necessary vocabulary for safety analysis.

The historical context for studying commission errors is heavily tied to the development of human reliability assessment and safety science. Early research focused heavily on aviation and nuclear power, environments where active errors carry catastrophic potential. Researchers sought to identify which cognitive bottlenecks and environmental stressors--such as fatigue, time pressure, or poorly designed instrumentation--were most likely to elicit an active, incorrect response. The crucial shift was recognizing that errors were not merely the fault of incompetent individuals but were often the predictable outcomes of flawed systems interacting with normal human limitations, particularly the constraints of attention and the limited capacity of Working Memory. This led to the development of the **systems approach** to safety, emphasizing that errors of commission are symptoms of deeper organizational issues rather than isolated acts of human negligence.

Cognitive Processes Underlying Commission Errors

The underlying cognitive architecture that gives rise to commission errors is complex, involving the interplay of attention, memory retrieval, and executive control. A major contributor is the reliance

on cognitive schemas and automatic processing. When an individual encounters a situation that superficially resembles a familiar one, they may activate the incorrect schema and execute a sequence of actions that, while appropriate for the similar scenario, is disastrously wrong for the current context. This phenomenon is often termed a "strong-but-wrong" association, meaning the deeply ingrained motor or decision sequence overrides the correct, novel sequence. For example, typing a frequently used password into the wrong input field, even when consciously intending to type a username, is a classic skill-based commission error driven by the dominance of an overlearned motor sequence activated due to insufficient monitoring.

Furthermore, the limitations of Working Memory play a pivotal role, especially in knowledge-based commission errors, which occur in unfamiliar situations. When processing novel or highly complex information, the limited capacity of working memory can lead individuals to rely heavily on mental shortcuts, or **heuristics**, that result in faulty planning or decision-making. If a person must juggle multiple variables simultaneously under stress--such as a surgeon reacting to an unexpected complication--they may commit a commission error by prematurely selecting an option that seems plausible but has not been fully verified against all available data. This failure to adequately verify or check one's own assumptions is a critical cognitive precursor to many active mistakes, demonstrating a breakdown in the metacognitive monitoring loop essential for self-correction and error prevention.

A Practical Illustration in Everyday Life

Consider the common scenario of operating a modern, highly automated vehicle, which often involves complex interactions with touchscreen interfaces. Imagine a driver is navigating an unfamiliar area using a GPS system while simultaneously attempting to adjust the cabin temperature. The driver intends to press the small icon on the touchscreen that controls the climate settings. They are momentarily distracted by traffic or a passenger's question, causing their visual attention to briefly shift away from the screen just as their hand reaches the console. Instead of hitting the climate icon, their finger lands on the physically adjacent icon for "Emergency Hazard Lights." Despite the immediate flash of the lights, the driver confirms the action by pressing the button again, believing they are stabilizing the climate control setting, thereby actively engaging an unnecessary and potentially confusing safety feature.

The application of the commission principle here is evident: the driver intended to perform a necessary action (adjusting climate) but actively executed an incorrect, unnecessary, and disruptive action (initiating the hazard lights). This is not an error of omission; the person did not forget to adjust the temperature. Instead, they performed an active, motor action that was wrong for the current goal state. The step-by-step breakdown illustrates that the error occurred due to a **slip at the skill-based level**, exacerbated by distraction and poor interface design. The motor routine for reaching and pressing a button was activated, but the specific target (the hazard light

button) was chosen due to environmental proximity and the momentary lapse of focused attention caused by the distraction. The cognitive mechanism involved the failure of the attentional filter to inhibit the automatic selection of the adjacent, dominant button press, resulting in a physical act of commission that actively interfered with the driving task and potentially misled other drivers.

Significance, Impact, and Clinical Relevance

The study of commission errors holds profound significance across psychology because it offers direct insight into the limitations of human performance under various conditions, particularly stress and cognitive load. In clinical psychology, understanding the propensity for active errors is vital in diagnosing and treating certain conditions. For instance, individuals with **Attention Deficit Hyperactivity Disorder (ADHD)** or specific executive function deficits may exhibit a higher rate of commission errors due to impaired inhibitory control. They might impulsively give an incorrect answer or initiate a task prematurely, even when they possess the necessary knowledge to perform correctly, demonstrating a fundamental failure to suppress the prepotent but wrong response, which can severely impact academic and professional performance.

Furthermore, in forensic and legal contexts, the distinction between commission and omission is often central to determining culpability or negligence. Psychologists serving as expert witnesses frequently analyze whether an individual failed to act (omission) or actively performed a detrimental act (commission), which speaks directly to intent and cognitive state during the incident. In occupational settings, analyzing commission errors provides the necessary data to redesign procedures, restructure training modules, and overhaul human-machine interfaces. By identifying the specific points where individuals are most likely to actively choose the wrong path, safety engineers can implement **forcing functions**--design features that make it physically impossible to commit the error--thereby enhancing overall system reliability and safety margins, transforming environments from relying on human vigilance to relying on systemic defenses.

Applications in High-Stakes Environments

The most critical applications of commission error research are found in high-stakes environments where the consequences of active mistakes are immediate and severe. In medicine, for example, medication errors often fall into the commission category, such as administering the wrong drug, selecting the wrong patient file, or initiating an incompatible treatment regime. The field of patient safety relies heavily on reducing these active errors through standardization, checklists, and improved communication protocols, such as those used in surgical theaters. Studies consistently show that when medical staff are fatigued or multitasking, the probability of complex, rule-based commission errors increases exponentially, leading institutions to invest heavily in strategies that minimize the cognitive burden on practitioners, often by automating decision processes or providing visual confirmation systems.

Similarly, in the field of aviation and nuclear power, the analysis of active errors has driven decades of improvement in control panel design and training methodologies. If a pilot incorrectly calculates fuel load (a knowledge-based commission mistake) or executes an emergency procedure in the wrong sequence (a rule-based commission mistake), the results can be catastrophic. Human Factors engineers meticulously study how display layouts or control placements might inadvertently encourage the selection of the wrong switch or dial, thereby designing interfaces that maximize visual and tactile differentiation between controls to prevent these specific active slips and mistakes from occurring. The entire philosophy of **Crew Resource Management (CRM)** is built, in part, on developing communication strategies that actively encourage team members to catch and correct commission errors before they transition from a latent system flaw into an active, critical incident.

Connections to Related Psychological Concepts

The concept of the Error of Commission is closely connected to several other major psychological theories, primarily residing within the broader subfield of Cognitive Psychology and Human Performance. Firstly, it is intrinsically linked to the concept of **Inhibitory Control**, a key component of executive function. Commission errors often manifest as a failure of inhibition--the inability to suppress the strong, easily accessible, but incorrect response in favor of the effortful, correct response. This overlap links the study of commission errors to clinical research on impulsivity and frontal lobe function, particularly in understanding pathologies that involve poor self-monitoring.

Secondly, the idea is central to **Schema Theory** and the study of automaticity. Many commission errors are examples of "capture errors," where an action sequence intended for a frequently performed task "captures" or overrides the current, less familiar sequence. This demonstrates how highly automated cognitive structures, while incredibly efficient in normal circumstances, can become a liability when a slight deviation from the routine is required. Finally, commission errors are systematically studied within **Signal Detection Theory (SDT)**, particularly in tasks requiring rapid discrimination. In SDT terms, a commission error can be interpreted as a "False Alarm," where the individual incorrectly perceives a signal or condition that is not present (or selects an option inappropriately), leading to an active, incorrect response. The analysis of these active response biases forms a crucial part of understanding human decision-making under uncertainty and risk.