Understanding the Biological Basis of COMPLACENCY

By Sharon Lipinski

BUSINESSES THAT RELY ON REPETITIVE TASKS face a workplace disrupter: complacency. The adverse effects of complacency in the workplace have been an ongoing source of concern in the OSH community. This all-too-prevalent workplace condition often results in incidents as well as decreased efficiency and attendant costs.

What is not agreed upon is the reason for this problem. In the author's experience, she has noticed that while OSH professionals are concerned about complacency, there is no agreement as to its definition; professionals use the term in different ways to refer to different kinds of events.

Merriam-Webster offers the following definition of complacency: "self-satisfaction especially when accompanied by unawareness of actual dangers or deficiencies." This definition is so connected to safety that it is accompanied by the following example sentence: "When it comes to safety, complacency can be dangerous." However, this definition does not offer the OSH professional much help in clearly identifying what complacency is and when it is a risk factor.

This article aims to explore a previously undiscussed component to complacency: basic brain design. Given how the human brain has evolved to operate, complacency is an unavoidable risk factor that can be managed but not eliminated. With this scientifically based understanding of complacency, OSH professionals can more effectively prevent complacency from posing a risk to employees' safety. The article will offer six principles to guide OSH efforts. Strategies and examples illustrate how each principle can be applied to real-world safety scenarios.

KEY TAKEAWAYS

- **This article presents a new perspective on why hazards occur with repeated, habitual tasks.**
- **Complacency is not what many OSH professionals believe it to be. It is a by-product of a neural pathway deep in the brain, isolated from much of the prefrontal cortex (PFC) activity essential for external awareness and sensitivity to hazards.**
- **An understanding of the neuroscience of complacency will allow OSH professionals to more effectively advise companies to manage complacency and mitigate the adverse consequences of task repetition by engaging the PFC function of the brain.**

DRAFTER123/DIGITALVISION VECTORS/GETTY IMAGES

Complacency Poses an Urgent Problem

In April 2020, the author sent out a national quantitative online survey directly to more than 500 safety professionals and posted it on the ASSP Community forum (see "Survey Questions" sidebar on p. 32). A random opt-in sam-

ple of 132 safety professionals in more than eight business sectors completed the survey (Table 1). The author then interviewed 21 safety professionals. In these interviews, the OSH professionals shared more in-depth insights into their experiences with complacency and how they are tackling this problem in their own organizations.

Safety professionals report complacency as a widespread problem that plays a role in 67% of safety incidents (including close calls, near misses, and incidents of bodily injury, equipment, site or environmental damage). In the post-survey interview, one OSH professional with 20 years of experience in mining and construction remarked, "Always assume complacency is a problem." Based on the data as well as the author's own consulting experience, this sentiment is consistent across industries.

Given the significant role safety professionals perceive complacency plays in causing workplace incidents, it is not surprising that these professionals ranked complacency as a high-priority problem. On average, complacency ranked 7.7 where 10 represented the highest priority among problems that need to be addressed to prevent more incidents (Figure 1). In addition, during the post-survey interviews, a handful of safety professionals shared anecdotally that complacency is the single most important challenge that organizations need to tackle.

Who is in the best position to assess when complacency is a problem? Safety professionals reported that employees by and large cannot be counted upon to recognize when complacency is impacting their safety. On average, the ranking came in at 4.5 on a 10-point scale (Figure 1). These OSH professionals are less than moderately confident that employees can recognize when complacency is impacting their safety. Without being able to recognize when complacency is an issue, employees' ability to successfully avoid problems associated with complacency is severely hampered.

How did OSH professionals rate their own ability to proactively address this problem? Notably, many safety professionals do not feel confident tackling the problem of complacency. In the survey, OSH professionals ranked their success in providing strategies that employees actually use to avoid complacency at just 5.7 on a 10-point scale (Figure 1).

Complacency is not just a safety concern. The author's post-survey interviews with safety professionals expanded beyond the parameters of the survey to include anecdotal observations that complacency results in problems in quality, meeting deadlines and productivity. It is beyond the scope of this article to provide quantification of the financial impact of events due to complacency. Nonetheless, the effect of workplace problems associated with complacency, as reflected in higher workers' compensation and insurance premiums, damage to business reputation and a decrease in employee morale, is worthy of consideration. In the post-survey interview, one OSH professional, a director of quality, environment and safety with more than 20 years of experience across military, construction and renewable energy industries, estimated that organizations could double their profit by effectively addressing complacency. While this article does not directly assess the monetary and reputational cost attributable to complacency, the resulting discussions certainly merit further investigation.

The author contends that this random sampling across a variety of industry sectors is useful in that it reveals that complacency is perceived to be a pervasive and expensive problem in the workplace, yet there is no well-identified cause, much less a clear set of strategies for addressing it.

Confusing the Symptoms With the Root-Cause of Complacency: The Need for a Working Definition

What constitutes complacency is currently not well defined in the safety industry. Figure 2 (p. 34) details the responses of 132 safety professionals to the question, "What is the driving condition that leads to complacency?" Of those safety professionals, 50% concluded that complacency resulted from what could be categorized as a reflection of an employee's work ethic or abilities. Specifically, 8% said that complacency was due to an employee not paying attention to what they were doing, 22% said it was due to the employee not taking the risks seriously and 20% said complacency was due to the employee being overconfident that they mastered the task.

Another 34% of respondents identified habit as the driving cause of complacency, and 14% offered other causes including "all of the above," poor training or inadequate planning. The author maintains that the strong support for different conditions that drive complacency demonstrates that complacency is not a well-defined, understood or agreed upon problem in the OSH community.

SURVEY QUESTIONS

"The Role of Complacency in Safety" survey created April 2020, completed August 2020 via Survey Monkey.

Q1: What industry are you in?

Q2: What is your job title?

Q3: What is the driving condition that leads to complacency?

Answer choices:

- **Employee isn't paying attention to what they're doing.**
- **Employee isn't taking the risks seriously and takes for granted that an accident won't happen to them.**
- **Employee is over confident that they've mastered the task.**
- **Employee is unaware of the risks.**
- **The action has become a habit,**
- **Other (please specify)**

Q4: On a scale from 1 to 10 with 1 being never and 10 being every time, how frequently does complacency play a role in safety incidents (include close calls, near-misses and actual incidents of bodily injury/equipment/site/environmental damage)?

Q5: On a scale from 1 to 10 with 1 being not at all and 10 being a top priority, how urgently does complacency need to be addressed relative to preventing safety incidents?

Q6: On a scale from 1 to 10 with 1 being not at all and 10 being totally, how confident are you that your employees can recognize when complacency is impacting their safety?

Q7: On a scale from 1 to 10 with 1 being not at all and 10 being totally, how successful are you in providing strategies your employees actually use to avoid complacency?

Q8: Have you attended a talk by Sharon Lipinski on habits?

Q9: Would you like to be interviewed and share some of the best practices you've discovered to combat complacency?

TABLE 1

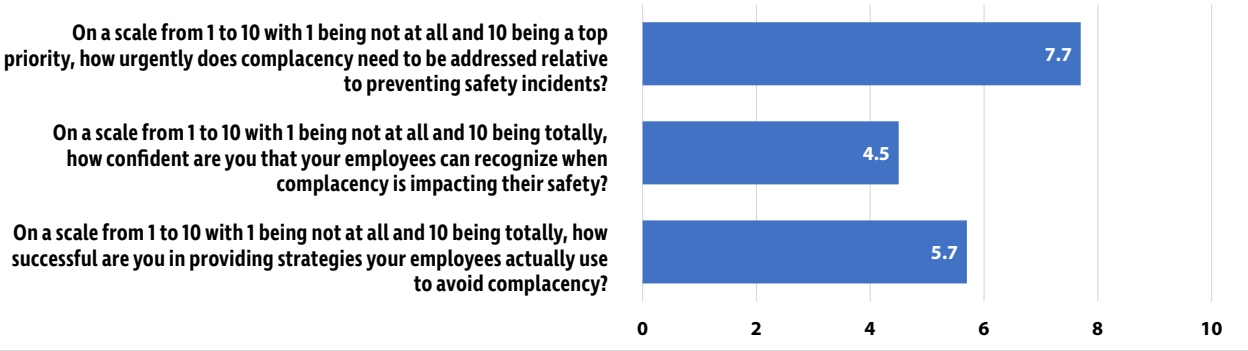
BUSINESS SECTORS

A random opt-in sample of 132 safety professionals in more than eight business sectors completed the survey.

Answer choices	No. of responses (%)
Construction	45 (34.09%)
Government	13 (9.85%)
Healthcare	3 (2.27%)
Manufacturing	11 (8.33%)
Military	1 (0.76%)
Mining	1 (0.76%)
Oil and gas	8 (6.06%)
Safety or other consultant	8 (6.06%)
Transportation	1 (0.76%)
Utility	22 (16.67%)
Other (please specify)	19 (14.39%)
Total	**132**

FIGURE 1
SURVEY RESPONSES

Average rank given by safety professionals in response to three survey questions about complacency.



To make this more complicated, complacency is not an easily observable condition, and objective criteria, whether it be a person's affect or movement, can be elusive. Based on the post-survey interviews with OSH professionals, the author compiled a list of anecdotal clues that these professionals use to gauge the presence of complacency:

- working too fast or too slow
- eyes not on task
- occupying space in the "line of fire" or danger zone
- multitasking (e.g., having conversations while working)
- not taking risks seriously (e.g., goofing off or bragging)
- not following the procedures (e.g., using a two-handed tool with one hand)
- not completing checklists or "pencil whipping" them
- skipping basic PPE or safety requirements
- an increase in incidents without easily identifiable root causes
- the frequency of rework incidents
- decreasing frequency of near-miss or good-catch reports

The traditional approach to combatting complacency, based on these types of clues, has been to attempt to "fix" employees' mental and emotional states. Solving complacency is often viewed as needing to raise employees' sense of responsibility and attention to detail. Tactics include reminding employees to pay attention and think about what they are doing and admonishing them to slow down.

Refusing to tolerate shortcuts or wishing that employees care more about their work is not the answer. As one OSH professional with more than 20 years of experience in the mining and construction industries shared during the post-survey interview, complacency is so hard to combat because "it's human nature." Trying to eliminate a feature of human nature with strongly worded advice to not be human is unproductive at best and, at worst, decreases morale as employees can feel it is a reflection of their work ethic and that they are responsible for incidents that occur.

More critically, the author argues that these external expressions are symptoms of complacency that are driven by a biological root. Targeting the symptoms of complacency will not eliminate this hazard. Effectively tackling this hazard requires targeting the root cause, which requires understanding how the brain handles repetitive behavior.

Basic Brain Design: The Neuroscience of Habit

Neurobiologists have studied how habits are created within the brain. According to Amaya and Smith (2018), "The general consensus is that parallel and competing circuits exist in the brain for habits and goal-directed actions" (p. 145). While the research is still underway to understand the role and sequence of circuit nodes and connections, molecular mechanisms and other neural dynamics, certain concepts of brain design and function are established science and help explain how the brain responds to repeated tasks. In common expression, the word "habit" is often used to refer to behaviors, but this is not a scientifically accurate definition of what a habit actually is. A habit is a physiological phenomenon that takes place inside the brain. Advanced neuroimaging and scientific experiments have revealed that a habit is a neural pathway created through repetition and involves the collaboration between two parts of the brain: the prefrontal cortex (PFC) and the striatum (Coutureau & Killcross, 2003).

The PFC is the part of the brain that sits above the eyes and is involved in many of our executive functions. It is essential in making decisions, planning, focusing thoughts, paying attention, learning and considering several different yet related lines of thinking. It is used for evaluating the future consequences of current activities, working toward a defined goal, predicting outcomes, interpreting social cues, moderating social behavior, and determining good and bad, better and best. The PFC helps retain information while performing a task, determines what information is relevant to the task in progress and keeps the objective of the task in mind (Diamond, 2013). These behaviors read like a wish list of employee behavior. Employees would be eminently safer and more productive if they were using their PFC all the time.

The striatum is found in the center interior of the brain at the top of the brain stem. It is the habit, reward and goal-motivated behavior center of the brain (Amaya & Smith, 2018; Smith & Graybiel, 2016). According to Graybiel and Grafton (2015), the striatum interacts with the PFC to give us "reinforcement-based feedback to allow effective combination of sequential motor elements. Thus, whether we speak of habits or skills, we see the striatum as a sort of learning machine dedicated to achieving success in behavior" (p. 2).

When someone performs a behavior or action for the first time, the PFC fires and communicates in a loop with the striatum. When the brain is doing something new, a lot of work is expended, and all the neurons along this path between the PFC and the striatum fire. The brain is a quick learner; the next time it repeats the same action, it is a little more familiar, so fewer neurons fire. As this process is repeated, the action gets progressively easier, and fewer and fewer neurons fire (Amaya & Smith, 2018). When something has become a habit, only the neurons at the beginning and end of the action must fire. The bulk of the action can be on autopilot, freeing up mental activity (Smith & Graybiel, 2016).

Just like brushing one's teeth after flossing or tying one's shoes after putting them on, Graybiel and Grafton (2015) explain that the brain eventually retains this sequence without needing a reward, leading to "'automaticity' and a resilience against competing actions that might lead to unlearning" (p. 2).

For purposes of this article, the author argues that understanding two key points from the neurobiological studies and academic literature will enable safety professionals to manage

risk in the workplace: 1. once habits are created, the sequencing "moves" to a different part of the brain; and 2. when a behavior or action has been repeated often enough to become a habit, the PFC no longer needs to be involved to successfully complete it.

To confirm her understanding of how the brain handles habit, the author contacted Eric Burguière, neuroscientist and principal investigator at the Paris Brain Institute, who supervises several projects that aim to understand the neurophysiological basis of repetitive behaviors. He confirmed these takeaways, saying:

> By practicing an action, there's a shift from the first time you're doing it. The brain structure that will be required to do the same action will shift to a different part of the brain. Because it's been successful and has been repeated enough, it slowly modifies some circuits in the brain that take over and automate it. You need less and less clues to trigger the action. (E. Burguière, personal communication, June 2, 2020)

Simply stated, repetition is the mother of habit. By repeating an action over and over, a person carves a neural pathway deep in the brain that requires little energy or effort to run. The human brain loves habits. It loves these neurological shortcuts. But in the workplace, complacency can have significant repercussions.

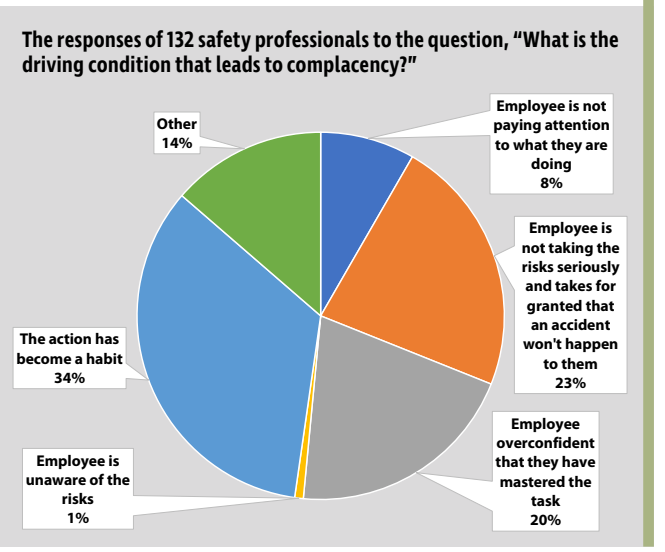
Habits Will Always Have Value in the Workplace

Every second, the brain must process an unquantifiable amount of information. This includes everything from our own autonomic nervous systems (e.g., internal temperature, heart rate, eye blinking) to taking in external stimuli in the form of colors, shapes, locations, movement and more. Unfortunately, the processing capacity of the brain is limited. Kahneman (2011) writes of the difficulty and even impossibility of trying to calculate the equation 17×24 while trying to make a left-hand turn on a busy road. Aside from unlikely scenarios involving mathematical calculations while driving, the limited processing capacity of the brain means that the brain all too often has more potential work than resources to complete that work, so it is constantly making trade-offs and decisions about what is more important.

With this plethora of information to process, the brain must rely on shortcuts. There are many different types of shortcuts, but the one applicable to this topic is habit. A habit is a neurological shortcut the brain can use when engaged in a repetitive task. The range of repetitive tasks is quite large. It includes not only actions such as brushing one's teeth and wearing PPE, but also behaviors such as asking for help, reacting calmly in stressful situations and problem-solving. Beyond behaviors, people have created habits to process emotions, thoughts, decisions and actions (Wood et al., 2002). Habits let the brain do more with fewer resources. While completing a repetitive task, the brain uses these shortcuts to make quick work of any situation encountered throughout the day, whether at home, work or elsewhere. Freed up mental resources are then available for other cognitive tasks.

Habits are an impressive productivity tool for the brain. They allow people to perform tasks more reliably and more quickly. Habitual behaviors also free up more cognition space in our brain, allowing us to multitask and tackle more demanding undertakings. Essentially, habits free up our brain to do other things and can give us a competitive advantage (Wood et al., 2002). As Eric Burguière (personal communication, June 2, 2020) says, "Habits are very efficient in a way that saves resources to spend more time on processes that need more of your cognitive function. Attention, planning and memory load . . . these kind of things are very demanding."

FIGURE 2
WHAT CONSTITUTES COMPLACENCY?



Even if productivity were not the goal, our brains would employ habits because it is easier and relieves the cognitive toll of so much information flooding our brain through the course of our daily lives. In rather unscientific terminology, the bottom line is that the brain is essentially lazy. It tries to accomplish tasks using minimal energy. Kahneman (2011) writes that one of the main characteristics of the part of our brain correlated to the executive functions handled by the PFC "is laziness, a reluctance to invest more effort than is strictly necessary" (p. 31). In other words, the brain does not want to fire up the PFC if it does not have to for any longer than it needs to.

But there is a price exacted when habits are triggered: the PFC is often no longer actively involved in brain processing. When the PFC is not engaging, then we have lost an important safety resource. Habits are a double-edged sword. They are essential for executing many safety protocols, but they also cause us to lose another tool in our safety kit: robust PFC activity.

When the PFC is not engaged in the task at hand or not paying attention to the dynamics of the current environment, people are not left entirely defenseless. The brain's basic operating system still monitors the external environment, looking for clues that things are not quite right. This is why loud noises and sudden movements will jolt us into alertness. When this basic operating system notices a clue or problem, it will alert the PFC that it must engage to properly assess what is occurring (Amaya & Smith, 2018). Unfortunately, the brain's basic operating system can miss many subtle clues and continue on autopilot even when it would be wiser, safer and more productive to engage the PFC.

A New Definition of Complacency

Habits are a value-added feature of our brain. Unfortunately, habits also result in people being less aware of what is going on around them. Repetition opens the door to complacency.

The author offers a scientifically based definition of complacency: Complacency is a state of decreased external awareness and reduced sensitivity to hazards caused by the brain's ability to activate neural pathways that require less PFC activity.

This definition reflects the current neurobiological assessment of what happens in the brain when habits are established. Most importantly, this definition reflects that complacency is an internal state, not one easily observable. In fact, for all practical purposes, it is impossible to identify complacency externally. While scientists in labs have used the dilation of pupils to track PFC engagement (Kahneman, 2011), it is not a method that can be deployed in real-world circumstances to detect complacency in real time.

By looking at indicators such as working too fast or slow, eyes not on task and having conversations while working, OSH pro-

fessionals are looking for external clues of an internal state. Unfortunately, complacency cannot be resolved by focusing on these outer symptoms, because even if the OSH professional successfully removes all outward expressions, there is still no guarantee that the employee's mind is engaged in the task at hand. The author is chagrined to admit that she can be looking at her husband, nodding her head, and still not be listening to what he is saying.

Accepting the biologically driven nature of complacency not only eliminates the stigma of complacency, it also creates a path for effectively tackling this hazard. Effectively tackling complacency means reengaging the PFC. The more cognitively engaged employees are, the safer they will be.

Principles for Managing Complacency

The neurobiological reality of habits and limitations of human brain design hold many significant ramifications for OSH professionals who can use the brain's natural tendency to employ neural shortcuts to their advantage or reengage the PFC when complacency is a disadvantage. OSH professionals should take the following six principles into consideration when attempting to address complacency. Within each principle, the author offers examples and strategies, some of which were shared by OSH professionals during post-survey interviews.

Use Repetition Strategically

Repetition is important, as is the quality of that repetition. In the workplace, many desired behaviors should be practiced until neural pathways are created and employees no longer need to think about what they should do or whether they should do it. For example, maintaining three points of contact on a ladder or truck when descending should happen automatically, and that behavior can be practiced repeatedly until it becomes the only way that employees descend. If the default neural wiring follows the safest behavior, then the base safety level is higher.

It is important that OSH professionals identify not only the daily procedures that should happen without fail, but also the emergency procedures employees should know and be able to perform rapidly, confidently, and without error if and when the time comes. The U.S. Army's mantra is instructive: "We don't practice until we get it right, we practice until we can't get it wrong." Practicing builds necessary neural pathways.

Support Your Most Experienced Employees

The more experienced an employee is with a specific activity, the more easily that person's brain relies on neural wiring shortcuts that do not require engaging the PFC, leaving them less aware of potential hazards. In other words, the most experienced and most valuable employees are at the greatest risk of complacency and need the most resources and strategies to avoid this hazard.

Many of the safety professionals interviewed encourage cross training and having employees perform different types of work. Fresh eyes can notice potential hazards that more experienced employees have become accustomed to and have learned to work around. Those hazards can then be mitigated or eliminated.

Reduce Repetitive Tasks

Complacency is not a conscious choice or a moral failing; it is how the brain is designed. The better the brain can get at moving behaviors to habit level, the more efficient it can be with its limited resources. Most of the time, complacency works in favor of the employee and the person's productivity, but too much repetition can lead to zoning out.

One way to limit the risk of complacency is to ensure that the more repetitive the task, the shorter the amount of time an employee should be dedicated to that task before changing activities. OSH professionals should identify the most repetitive tasks and, based on the potential severity and other potential consequences of an error, evaluate how long that activity should be performed before switching tasks. More variety will benefit cognitive engagement.

Reduce Cognitive Load

It is critical to always take into account that the human brain has limited processing power. As noted, cognitive resources are directed to a wide range of internal and external activities. Cognitive resources spent on one area cannot be used for another area. OSH professionals and their organizations should avoid adding unnecessary cognitive load, so they must carefully evaluate the steps, forms and checklists that employees are required to complete. Consider reducing or avoiding unnecessary cognitive toll by streamlining forms and eliminating unnecessary steps.

Cognitive resources are consumed not only by basic daily job activities but also by coworker drama, pandemic stress and financial problems. Stress is a large consumer of cognitive resources, and effective stress management strategies can help the brain process information more quickly, increase emotional resourcefulness and improve decision-making skills by reducing the cognitive load and activating the PFC (Cerqueira et al., 2007). Employers should reduce work-related sources of stress and consider providing access to mental health resources that can improve stress management skills.

Increasing employees' sense of agency, their feeling of control over their work and lives, will also decrease their stress level. Engage employees in deciding how work gets done, allow them to adapt the work to better reflect their own expertise and enlist their assistance to improve processes and safety.

Related to reducing cognitive load is ensuring that maximum cognitive resources are available. The average adult human brain is only 2% of a person's total body weight, but it uses 20% of the person's energy (Jabr, 2012). The human brain is sustained by good nutrition, hydration and managing fatigue. In the post-survey interviews, OSH professionals reported that providing healthy snacks, ensuring regular breaks, scheduling shifts to provide needed rest and ensuring adequate hydration are key strategies they are using to help employees stay in peak physical condition.

Reengage Executive Functions

Interventions to prevent complacency must address the root cause and stimulate brain activity. External cues should be built in to alert employees when something is outside the norm or to remind employees that their full executive functions should be involved in a task.

OSH professionals should identify cases where employees are conducting repetitive tasks and provide a visual cue or a systemic pause to allow employees the opportunity to notice and correct an error. New smart devices have cognitive engagement tools built into their functionality. For example, Ford Motor Co. has improved the assembly of its 10-speed rear-wheel drive transmission by using an integrated wireless tool that projects lights to let operators know that they are both using the correct tool and using it in the correct location (Jusko, 2021). This visual cue is an opportunity for operators to reengage and correct a potential problem.

A second place to reengage is before executing an unrecoverable step: something that cannot be undone once it is done. Safety professionals should identify these unrecoverable tasks or actions but also implement systemic pauses that will fully engage the employee's executive functions before proceeding with the next step.

The successful implementation of new technology used before surgery is one example of proactively preventing irreversible error.

Despite the existence of universal checklists and protocols codified in the Universal Protocol guidelines promulgated in 2004, wrong site surgeries (e.g., surgeries performed on the wrong patient, wrong body part) continue to be an alarming problem in medical facilities globally (Gloystein et al., 2020). The StartBox System was developed to resolve this problem and is initiated via a mobile application. Through a series of voice recordings, color-coding for laterality (side where surgery is occurring), Universal Protocol checklists and time-out requirements, the process ends with a physical forcing function as a final constraint: the blade for the first incision is not delivered to the surgeon until the patient's identity, correct procedure, correct site and correct laterality have been confirmed and documented by the surgical team. With the use of this new technology, wrong site surgeries were eliminated (although the sample size was too small for statistical projectability).

Overall, improving employees' anomaly detection and situational awareness skills will help reengage executive functions when necessary and appropriate. As noted, even when the brain is operating on habit, it nonetheless monitors the external world for clues that something is off, different or needs attention. When the brain notices an anomaly, it brings online the brain's executive functions to assess, respond and adjust the routine if necessary. The more familiar the brain is with an activity and the more that freed-up cognitive energy is being directed elsewhere, the greater the intensity those external cues must be to attract attention. Employees may not notice smaller, quieter warning signals that could indicate a potential problem. Helping employees be more sensitive to anomalies is a key complacency fighting strategy.

Plan for the Inevitable

As employees pick up a new activity or implement a new safety procedure, the process of building neural pathways begins. At that point, complacency will become a risk factor. This is never a hazard that OSH professionals can check off a safety list because it will never go away. Every human being's brain is inclined to rest in habit mode and avoid activating its executive functions whenever possible. It is inevitable. Plan accordingly. Strategically reengaging the PFC, surprising employees and triggering awareness must be a constant process.

Because that which is expected allows the brain to stay in habit mode, it is essential to break the routine to regain the attention of employees. OSH professionals must try to change up trainings with different topics, perspectives, modalities and instructors. Ongoing communications must also stand out as different and new to avoid being tuned out.

Conclusion

Rather than thinking of complacency as a "bug" in our brain, employers should think of complacency as a feature that affects workers from C-suite executives to unskilled labor. Complacency often works toward the benefit of the employee and the company as it allows for rapid learning and increased productivity. It is distinct from carelessness or inattention, as those imply conscious choices; instead, complacency has a recognized basis in biology, is involuntary in nature and is, in many cases, the brain's preferred default state. On this basis, the strategies to counterbalance complacency must address these biological drivers.

Complacency occurs when repetition has carved a neural pathway deep in the brain that requires a relatively small cue to activate and little neural activity to complete. Employees performing repeated tasks are all too often operating without the executive functions of their PFC. Since the root cause of complacency occurs because of the brain's natural tendency to rely on habit and to engage the executive functions of the PFC as little as possible, targeting the root cause of complacency means periodically changing up the brain activity and reengaging the executive functions of the brain. The more cognitively engaged an employee, the safer the individual will be.

OSH professionals can use repetition to their advantage by practicing key behaviors until they become deeply ingrained in the brain, strategically prompt employees to reengage the PFC and avoid unnecessary cognitive expenditures. Successfully tackling complacency means helping employees, especially the most experienced employees, with comprehensive and ongoing cognitive engagement strategies. Safety professionals can guide a business to implement targeted business solutions to more reliably ensure a safe workplace and increase efficiency and overall job satisfaction.

Companies need to do more than just react when problems arise due to complacency. Action must be taken to anticipate and prevent the inevitable incidents. High-performing teams will undoubtedly benefit from anticipatory tactics. OSH professionals can be instrumental in giving clear, thoughtful guidance to companies to avert problems related to complacency. This can only be done after thoroughly discussing goals for each department and identifying strategies that will target habitual behavior. There is an ongoing need to share success stories within each industry and it is the hope that this article will jump-start this discussion and encourage further consideration of this inherently hazardous workplace reality. **PSJ**

Sharon Lipinski is the Habit SuperHero and CEO of Habit Mastery Consulting (www.habitmasterysconsulting.com), which helps organizations increase their targeted safety behavior by up to 150%. She is a certified gamification for training developer, certified cognitive behavioral therapy for insomnia instructor, speaker, TV personality and coach dedicated to helping people create the right habits so they can be happier, healthier and safer at home and in their work. Lipinski is a member of ASSP's National Capital Chapter, which she serves as program chair.

References

Amaya, K.A. & Smith, K.S. (2018). Neurobiology of habit formation. *Current Opinion in Behavioral Sciences, 20*, 145-152. https://doi.org/10.1016/j.cobeha.2018.01.003

Cerqueira, J.J., Mailliet, F., Almeida, O.F.X., Jay, T.M. & Sousa, N. (2007). The prefrontal cortex as a key target of the maladaptive response to stress. *Journal of Neuroscience, 27*(11), 2781-2787. https://doi.org/10.1523/jneurosci.4372-06.2007

Coutureau, E. & Killcross, S. (2003). Inactivation of the infralimbic prefrontal cortex reinstates goal-directed responding in overtrained rats. *Behavioral Brain Research, 146*(1-2), 167-174. https://doi.org/10.1016/j.bbr.2003.09.025

Diamond A. (2013). Executive functions. *Annual Review of Psychology, 64*, 135-168. https://doi.org/10.1146/annurev-psych-113011-143750

Gloystein, D.M., Heiges, B.A., Schwartz, D.G., DeVine, J.G. & Spratt, D. (2020). Innovative technology system to prevent wrong site surgery and capture near misses: A multi-center review of 487 cases. *Frontiers in Surgery, 7*. https://doi.org/10.3389/fsurg.2020.563337

Graybiel, A.M. & Grafton, S.T. (2015). The striatum: Where skills and habits meet. *Cold Spring Harbor Perspectives in Biology, 7*(8). https://doi.org/10.1101/cshperspect.a021691

Jabr, F. (2012, July 18). Does thinking really hard burn more calories? *Scientific American*. www.scientificamerican.com/article/thinking-hard-calories

Jusko, J. (2021, Feb. 7). Advanced technologies are taking Ford Into the Future Today. *Industry Week*. www.industryweek.com/manufacturing-technology-an-industryweek-event/article/21149441/advanced-technologies-are-taking-ford-into-the-future-today

Kahneman, D. (2011). *Thinking, fast and slow.* Farrar, Straus and Giroux.

Smith, K.S. & Graybiel, A.M. (2016). Habit formation coincides with shifts in reinforcement representations in the sensorimotor striatum. *Journal of Neurophysiology, 115*(3), 1487-1498. https://doi.org/10.1152/jn.00925.2015

Wood, W., Quinn, J.M. & Kashy, D.A. (2002). Habits in everyday life: Thought, emotion and action. *Journal of Personality and Social Psychology, 83*(6), 1281-1297. https://doi.apa.org/doi/10.1037/0022-3514.83.6.1281