Chapter 11

A Pragmatic Approach for Building Employee Motivation to Promote
Creativity and Organizational Innovation

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The New Professions of a Future Fantastic

Throughout human history, technology has dramatically reshaped our world, including the

nature of occupations and work processes. Visions of robotic integration into society are no longer

science fiction fantasies, but represent the current status quo to a degree greater than many people are

aware. Automation has made a profound impact on the employment landscape, with human

employees increasingly being replaced by robotic counterparts (Bogue, 2014; Chelliah, 2017; Frey &

Osborne, 2017). The arrival of lights-out manufacturing has created entire factories that do not

require the presence of humans. One of the more famous of these factories, FANUC in Japan, already

has robots manufacturing other robots in the complete absence of humans (Autor, 2015). As one

FANUC executive phrased it, "Not only is it lights out, we turn off the air conditioning and heat,

too." For many years, customer service has been seen as a refuge for the dramatic loss of employment

opportunities within agriculture and manufacturing on the premise that customers would always

desire human contact during their transactions. However, even customer service functions are being

increasingly taken over by adaptive software programmed for human persuasion (Landry, Mahesh, &

Hartman, 2005). Such automation has created a great deal of anxiety about the role of humans in the

world of tomorrow.

Although this irreversible trend shows many jobs being lost forever, it does not mean that

work itself has been eliminated. As old jobs are eliminated through technological advances, new jobs

begin to arise that require new sets of skills (Asimov, 1991). This is not a new discovery, as prominent psychologists and behavior analysts have spent decades calling for the improvement of education and training in order to meet the growing demand for specialized labor (Barlett, 1962; Skinner 1958; 1961). The skills that seem to be most reliant upon a human workforce are those that are typically characterized as creative and innovative (e.g., developing promotional and marketing solutions, composition and directing of music, graphics, and other arts, writing instructional or entertainment materials, developing theories and research, fashion design, choreography, designing of exhibits, video game development, use of social media, etc.), for machinery and software have yet to sufficiently master these skills (Autor, 2015; Brynjolfsson & McAfee, 2014; D. Johnson, 2015; Landry, Mahesh, & Hartman, 2005). Modern demands have forced organizations to adapt to ever-evolving novel conditions and this may necessitate more than the simple hiring of well-educated individuals. Instead, businesses find themselves increasingly pressured to engineer environments that continually promote innovation by their employees (Gundry, Muñoz-Fernandez, Ofstein, & Ortega-Egea, 2016). The ability of an organization to survive in the future may reside in the innovation of its employees and therefore creativity has become a business necessity.

Perhaps unsurprisingly, the demand for guidelines to promote creativity and innovation has led to a variety of recommendations from mass market books. The advice of these books can be far ranging and typically use the plurality of anecdotes as their evidence (Catmull & Wallace, 2014; Michalko, 2001; Robinson & Stern, 1998). For example, the bestselling book *Drive* continually suggests that the key to innovation is to harness intrinsic sources of motivation (Pink, 2009). This book is the latest in a series of arguments to suggest the destructive potential of extrinsic rewards (Kohn, 1993); although Daniel Pink tends to be a bit more forgiving regarding the past use of extrinsic rewards for the rote and mindless work that dominated the industries of yesterday.

Nonetheless, the argument is made that the creative needs of future organizations have little room for such external sources of motivation.

These arguments serve as clear warnings against the use of behavior analysis and by extension, organizational behavior management (OBM), even when these disciplines are not explicitly named by the authors. The implication is that external sources of motivation may have been valid in the past, but nowadays they are a relic in the modern business world—a 1950s psychology for a 1950s workplace. The field as a whole becomes marginalized as the psychology of rats, pigeons, intellectual impairments, and mindless work tasks. The more important complex higher-order skills are viewed as outside of the purview of behavior analysts and their simplistic carrots and sticks. While this is not all the field does, this is what it is mostly known for. In fairness to these criticisms, the literature of OBM often does itself a disservice. Popular OBM books and articles tend to have only the most superficial mentions of motivation (as it relates to both simple and complex behavior), creativity, and innovation, if these topics are mentioned at all (Braksick, 2007; Daniels, 2016; Daniels & Bailey, 2014; C. M. Johnson, Redmon, & Mawhinney, 2001). If the field is not as limited as the critics assert, then it is essential that the issues related to motivation, creativity, and innovation are addressed within a behavioral paradigm. Furthermore, it is equally essential the arguments of these critics are carefully examined.

Clarifying the Many Muddled Arguments

Addressing the critics of a behavioral approach can sometimes be difficult because they often employ definitions that are inconsistent, unobservable, impractical, and incompatible with a behavioral framework. Clear examples of this conceptual disagreement in regards to the concept of motivation can be seen with the terms such as "reward/reinforcer" and "intrinsic/extrinsic motivation". As a starting point, it is important to clarify what is intended by these concepts from both behavioral and non-behavioral perspectives.

Motivation is typically defined as a theoretical construct which is inferred from goal-directed behaviors. According to Levy (2017), "among the many definitions of work motivation, one that strikes me to be particularly useful is to view it as a force that drives people to behave in a way that energizes, directs, and sustains their work behavior." He explains further that "Motivation is an abstract internal concept that cannot be seen, touched or measured directly. We infer motivation from employees' behaviors; we operationalize it by measuring behavior choice, intensity and persistence." In defining motivation, it is important to look at what makes the verbal community call someone "motivated"; it is also necessary to focus on those variables that can be observed and controlled for if the goal is to generate motivated people. With these aims in mind, motivation may be defined as the process in which variables control and maintain goal directed behaviors. It is often divided into two categories: intrinsic and extrinsic motivation.

Perhaps due to the fact that intrinsic motivation is often treated as a hypothetical construct inferred from the behavior it is supposedly causing, it appears difficult to develop a universally accepted definition of this concept (Akin-Little, Eckert, Lovett, & Little, 2004). In general, intrinsic motivation is considered the causal variable for when performance occurs in the absence of obvious extrinsic rewards (Cameron & Pierce, 1994). There is often the implication that such internally driven actions are innate in origin (Dickinson, 1989), although it is sometimes also suggested that intrinsic motivation can also be learned (Pink, 2009). This conceptualization can be problematic because intrinsic motivation becomes the default source of motivation when observers fail to locate extrinsic sources of motivation. The fact that there is no easily discovered external variable driving a behavior does not mean that such variables do not exist. Extrinsic motivation could involve singular or multiple sources of reinforcement that may be subtle or infrequent, which means the external control could be easily missed by casual observation (e.g., very thin schedules of reinforcement, small facial expressions that quickly convey approval, etc.).

A behavioral conceptualization of intrinsic motivation is more explicit about the source of control. From this perspective, intrinsic reinforcers involve the sensory consequences directly produced by behavior and do not require the mediation by other individuals (Hayes, Rincover, & Volosin, 1980; Peters & Vollmer, 2014). The natural products of responding can have unlearned reinforcing properties or be acquired through pairing with other reinforcing stimuli. Despite the assertions of some critics, the possibility of genetically determined sources of reinforcement is not problematic for behavior analysis, especially since the reinforceability of an organism requires a genetic inheritance in the first place (MacCorquodale, 1970). This perspective allows for a form of automatic reinforcement in which response products may strengthen the very responses that produced them. This opens up the possibility of learned behavior persisting for extended periods of time in the absence of direct social mediation. Given the right history of pairing, the response products resulting from intense efforts could also become intrinsic reinforcers, creating a type of learned industriousness (Eisenberger & Armeli, 1997). While taking note of the implications for delivery considerations, there is no reason to believe that automatic and mediated sources of reinforcement would differ dramatically in terms of their effect on behavior. The question of whether intrinsic or extrinsic rewards/reinforcers have differential effects is ultimately an empirical issue, which will be discussed shortly.

Before examining the evidence, some more terminological clarification is necessary. It is important to recognize that rewards and reinforcers are not synonymous despite the fact many researchers have treated them as though they were interchangeable (Akin-Little, Eckert, Lovett, & Little, 2004; Dickinson, 1989; Peters & Vollmer, 2014). Rewards are performance consequences assumed to increase the probability of behavior, although a demonstration of this effect is not required. Reinforcers are performance consequences that increased the strength of subsequent behavior, regardless of any assumptions being made about their impact. To put it differently,

rewards are defined by their *intended* effect on behavior whereas reinforcers are defined by their *actual* effect on behavior. Although these concepts sometimes overlap with one another, in practice they are not always conveniently connected. The problem with confusing rewards with reinforcers is that many of the studies that concluded that *reinforcers* decrease intrinsic motivation actually used *rewards*. Another point of confusion between behavioral and non-behavioral conceptualizations relates to the range of stimuli that qualify as external consequences. It becomes clear that many non-behavioral authors only equate extrinsic consequences with token reinforcers. For example, Pink (2009) frequently criticizes the use of monetary rewards to extrinsically motivate creative performance, yet never seems to tackle stimuli such as praise, recognition, feedback, or verbal events in general. Behavioral conceptualizations of extrinsic reinforcers tend to be broader and more flexible than the stimuli imagined by many critics.

The Drive for Shunning Extrinsic Rewards as a Means of Producing Innovation

The arguments against extrinsic rewards appear to stem from viewpoints related to the overjustification effect, self-actualization, and a romanticism philosophy. The first of these—the overjustification effect—suggests that behavior motivated by intrinsic outcomes will be undermined or damaged if extrinsic rewards are applied (Bernstein, 1990; Cameron & Pierce, 2002; Kohn, 1996; Lepper, Keavney, & Drake, 1996). For example, if an employee is motivated by an interest in their job and an employer implements a performance-contingent reward system for a while and then stops it, that employee will no longer be motivated by their interest in the job. This detrimental effect is implied to be permanent which might explain the reason why extrinsic rewards are frowned upon.

There have been several claims made with bold confidence that are not matched by strong evidence in the empirical literature. As secondary sources elevated such inconsistent and weak evidence to the status of "accepted fact," the non-empirical claims of danger posed by external

rewards became even bolder. One of the most prolific opponents of rewards went as far as to claim that simply telling children "good job!" was a damaging parenting strategy and warned schools and businesses of the threat from behaviorism (Kohn, 1996; 2001; 2012). Some of the more fair-minded critics have tried to downplay the unwarranted extensions by their colleagues (Lepper, Keavney, & Drake, 1996), but this does not alter the fact that ungrounded speculations have caused countless educators, parents, and managers to view extrinsic incentives with suspicion (Cameron & Pierce, 2002; Deci & Ryan, 2013; Eisenberger & Cameron, 1996; Flanagan, 2017).

As mentioned earlier, the book *Drive* makes heavy use of claims about the potential harm of external incentives (Pink, 2009). A brief review of the content of this book may prove instructive for readers as an exercise in critical thinking. This book is not being chosen because of something particularly unique about it; these types of claims have been made before and variations of these claims will doubtlessly be made again. However, this bestseller does serve as a recent exemplar for illustrating the problems of bold and unwarranted claims regarding the relation between rewards, motivation, and creativity. Any OBM professional should be prepared to encounter these types of claims at some point in their career. In his book, Pink asserts three fundamental operating systems through which he claims that humans function: Motivation 1.0, Motivation 2.0, and Motivation 3.0. According to him, Motivation 1.0 presumes that humans are driven by basic needs such as food, sex, shelter, water, etc. He explains that this fundamental presumption worked in primitive times when humanity's sole purpose was survival, but the species is now long past such conditions. For that reason, Motivation 2.0 eventually emerged. The premise of Motivation 2.0 is that humans are also driven by rewards and punishment. Motivation 2.0 assumes that humans are not so different from other animals in regards to these original two sources of motivation. However, humans have become substantially more complex than they used to be. They are no longer required to do routine boring jobs and are now being tasked with interesting jobs that require creativity. He further argues

that extrinsic rewards and punishment may work for algorithmic tasks (i.e., rote behaviors that can easily follow a clear and simple set of rules), but they are detrimental to more complex tasks that depend greatly on intrinsic motivation. This leads him to claim that Motivation 2.0 has run its course and has become largely obsolete. In its place, he recommends an upgrade termed Motivation 3.0.

The underlying premise of Motivation 3.0 is that the behavior of humans are not just influenced by basic needs, rewards and punishment, but that humans have higher drives, many of which are internal. In order to fulfill this set of needs, Pink suggests that we do away with extrinsic motivation and focus on cultivating intrinsic motivation by ensuring that individuals have autonomy, mastery and purpose. To illustrate this, *Drive*—like many other popular press books—relies on several anecdotes that are easily captivating in the absence of a critical analysis. For example, the first chapter (Pink, 2009) opens with a thought experiment involving an economist living back in 1995 who is told about two upcoming encyclopedias:

> The first encyclopedia comes from Microsoft. As you know, Microsoft is already a large and profitable company. And with this year's introduction of Windows 95, it's about to become an era-defining colossus. Microsoft will fund this encyclopedia. It will pay professional writers and editors to craft articles on thousands of topics. Well-compensated managers will oversee the project to ensure it's completed on budget and on time. Then Microsoft will sell the encyclopedia on CD-ROMs and later online.
>
> The second encyclopedia won't come from a company. It will be created by tens of thousands of people who write and edit articles for fun. These hobbyists won't need any special qualifications to participate. And nobody will be paid a dollar or a euro or a yen to write or edit articles.

Participants will have to contribute their labor sometimes twenty and thirty

hours per week—for free. The encyclopedia itself, which will exist online,

will also be free—no charge for anyone who wants to use it. (pp. 15-16)

The hypothetical economist is then asked to predict the fates of these two encyclopedias, stating that any rational person would naturally select Microsoft's Encarta over Wikipedia. Of course, the outcome of the described encyclopedias will likely be known to the present day reader. The Encarta encyclopedia no longer exists, except as an entry on the popular Wikipedia. This is suggestive to the reader that the typical understanding of what drives human behavior is somehow seriously flawed. The conclusion is then drawn that the extrinsically driven Encarta employees were somehow negatively impacted, as compared with the intrinsically driven Wikipedia contributors. However, this anecdote is misleading in that the motivation of employees was not the key factor in Encarta's demise. When it launched, Encarta had a staff of 70 editors, fact checkers, and indexers (Microsoft, 1997), as compared with the thousands of active contributors that have worked for Wikipedia each year for most of its existence. Even the most motivated 70 full-time employees are going to have difficulty competing with thousands and thousands of part-time contributors. This example also seems to grant little consideration to the experience of users in this contest between Encarta and Wikipedia. If the hypothetical economist had been asked, "Which do you think would succeed, the product that is free, easily found in popular search engines, and easy to access or the product that costs $30-$100 and is difficult to access?", it would be easy to imagine the economist making an accurate prediction. Unfortunately, due to the relative name recognition of the products for the average reader, this type of anecdote is likely to be quite persuasive, even though the success of Wikipedia had nothing to do with a demotivating effect of extrinsic rewards on Encarta employees. A similar misleading anecdote is later presented with the web browser, Firefox, again suggesting that the lack of extrinsic rewards for the Firefox volunteers was somehow the prime

factor for the browser's success (ignoring the fact that more popular browsers currently exist that have been created by paid employees). Management advice books like this often abound with such imprecise analyses of anecdotes, twisting them into whatever point the author is hoping to make at the moment. Again, the use of misleading anecdotes like this is not unique to Pink and any OBM professional would be wise to critically analyze the arguments from any author depending on them.

In many ways, the philosophy of Pink and his contemporaries could be viewed as a type of Maslow 2.0, a new wave of humanism mixed with some cognitive science. Pink frequently makes references to self-direction and self-actualization throughout his book as the main motivators for creativity and innovation. Self-actualization is the topmost need on Maslow's hierarchy of needs and Pink argues that organizations should be designed with this mind. Of course, the notion that organizational structures that foster employee progression through Maslow's hierarchy of needs will promote creativity is hardly a new one (Ghiselli & Johnson, 1970). Overall, Pink's claim is that humans possess higher drives such as the motivation to learn, to create, and to better the world. Unfortunately, theories of this type give managers very little recourse, except to perhaps stay out of the way of their employees and hope for the best.

The Puzzling Empirical Foundation behind the Shunning of Extrinsic Rewards

To the credit of Pink, he does cite some empirical studies to back up his anecdotes, primarily a series of studies conducted separately by Harry Harlow and Edward Deci. As depicted by Pink, Harlow investigated sources of motivation using eight rhesus monkeys. The book describes an experimental setup in which a mechanical contraption in the form of a puzzle was placed in the cages of the monkeys. To solve this puzzle, the monkeys would have to pull out a vertical pin, unhinge a hook, and then lift a metal hasp. Perplexingly, the monkeys spent two weeks solving this puzzle without any prompting by the experimenters. In the words of Pink, the monkeys spent their time solving the puzzles with "focus, determination, and what looked like enjoyment" (p. 2) and

became quite adept at this daily challenge. Towards the end of the two week period, Harlow added an extrinsic reward in the form of raisins. However, Pink reports that the introduction of an extrinsic reward disrupted performance by increasing errors. This is presented as an unexplainable finding according to the prevailing theories that was so contentious that Harlow had to abandon the research rather than fight the scientific establishment.

Unfortunately, Pink's description of the Harlow experiment is inaccurate for multiple reasons. The study in question—Harlow, Harlow, and Meyer (1950)—did indeed involve eight monkeys, but the procedures Pink described only applied to four of the monkeys. The monkeys were divided into two equal groups: Group A that was supposed to disassemble the puzzle and Group B that was supposed to assemble the puzzle. However, no instances of assembling behavior were observed with Group B and no data were reported for these four monkeys in regards to food rewards. The remaining four monkeys in the disassembling Group A did indeed spend much of the two weeks interacting with the puzzle, although the article never described their behavior in terms of focus, determination, or enjoyment (this embellishment was Pink's invention). Such patterns of behavior would not be unexplainable to behavior analysts, despite Pink's suggestion of a confused establishment (there is no evidence that Harlow was pressured to quit his supposedly "controversial" research), who have long acknowledged the possibility of sensory stimulation as an unlearned form of intrinsic reinforcement (Hayes, Rincover, & Volosin, 1980; Skinner, 1953). In regards to errors, there are several important things to note. First, for one of the four monkeys in Group A (Subject 151), the error rate actually decreased following the introduction of the raisins underneath the metal hasp. It is also worth noting that the most error prone monkey (Subject 143) had a history of making many errors prior to the introduction of external rewards. Finally, the topography of the errors is noteworthy. As Harlow and his colleagues stated,

The difference in the *kind of errors* is also very striking. In the initial

10 tests without food reward, the monkeys *never* approached the problem by

touching the hasp first; in the subsequent tests, all three monkeys *always*

erred by attacking (literally) the hasp first. (p. 231)

In other words, the monkeys tried to directly access the raisin that was crushed beneath the hasp

rather than perform the preceding steps of removing the pin and hook securing that hasp. When this

hastier tactic failed, emotional and aggressive behaviors were evoked that were likely incompatible

with careful manipulation of the puzzle. None of these events sound like monkeys suffering a loss of

performance motivation, even though Pink spends much of his book arguing about the demotivating

effects of external rewards on creative performance (also worth highlighting that Harlow's puzzle

was a rote, not creative, task). Nonetheless, the performance of only three monkeys was

inappropriately twisted to support a completely separate premise. Yet, for readers who are not

attentive to the finer details found in primary sources, it is likely that Pink's argument against

external incentives will be persuasive. Pink further bolsters his empirical evidence with human

participants using research studies conducted by Edward Deci. In his studies, Deci used the soma

puzzle which consists of seven pieces: six pieces with four one-inch cubes and one piece with three

one-inch cubes. Deci investigated the effects of monetary rewards on participants' engagement with

the puzzles. The detrimental effect of external rewards did not, in the words of the author, "reach the

customary .05 level" of statistical significance (Deci, 1971). Nonetheless, the author still claimed that

the findings supported the proposed hypothesis. One year later, the author conducted a similar

follow-up study which did not yield significant outcome ($p < .24$), yet it was claimed that the

supposed detrimental effect was "substantial and deserves some attention." (Deci, 1972). Much like

Harlow's puzzle, it is unclear how the rote puzzle solving behavior from an ambiguous set of

research results ties into workplace creativity, but the equivalence between external rewards and

negative outcomes is still being made in service of that argument. This shaky empirical foundation combined with several anecdotes forms the basis of asserting that creativity and innovation must be developed through intrinsic motivation. Again, Pink's arguments are not unusual within the larger context of criticisms leveled against rewards for influencing motivation and creativity, so, concerns about the misuse of anecdotes and evidence should not be restricted to this particular author.

Common Flaws across Research Studies

The research studies examining the detrimental effect of extrinsic rewards are more expansive than the few problematic studies cited earlier. As noted by several behavioral researchers, the following flaws are commonly seen across many research studies examining the impact of extrinsic rewards on intrinsic motivation (Akin-Little, Eckert, Lovett, & Little, 2004; Bernstein, 1990; Cameron & Pierce, 2002; Dickinson, 1989; Eisenberger & Armeli, 1997; Eisenberger & Cameron, 1996; Peters & Vollmer, 2014; Williams, 1980):

- Research designs: Research studies often fail to conduct repeated measures of performance, despite the fact that the primary concern is whether motivation is negatively impacted over time. Instead, much of the research utilizes pre- and posttest samplings of behavior. The observation periods of the sessions used in the studies are typically short and there is usually no follow-up after the study. The majority of studies that have employed repeated measures do not find evidence of a detrimental effect of external rewards.

- Consequences: It is rare that the consequences used in the studies that criticize external reinforcement are actually tested for reinforcing properties. Rather, the use of untested and often non-contingent rewards is assumed to be equivalent to the use of contingent reinforcers. This is a problematic assumption for reasons discussed earlier.

- Performance standards: The manner in which instructions are given for earning rewards tends to be overlooked by researchers. Many studies do not establish minimum standards for rewards to be earned, unlike typical real world applications. Instructions can have a powerful effect on subsequent performance, a variable rarely controlled for in many studies critical of external consequences.

Given the inconsistency of evidence supporting the viewpoint that external rewards have a damaging effect on performance (creative or otherwise), it is curious how passionate the warnings against their use have been. As past authors have pointed out, this may be because at the heart of the matter resides a philosophical rather than empirical dispute (Akin-Little, Eckert, Lovett, & Little, 2004; Bernstein, 1990; Dickinson, 1989; Eisenberger & Cameron, 1996; Winston & Baker, 1985). The success of external rewards challenges the romantic individualism perspective of humanity, in which the autonomous organism is the initiator of their own actions. From this viewpoint, any perceived attempt to influence how people engage in self-discovery, self-expression, and self-fulfillment would be seen as threatening and/or wrongheaded, regardless of the results found in research. In a rush to have a confrontation for philosophical reasons, the science can sometimes be lost in the name of revolution (MacCorquodale, 1970). Nonetheless, for those more interested in practical, rather than philosophical, solutions for motivational issues, it is worth exploring a behavioral view of motivation and innovation. This is a critical consideration because many business owners may not be able to find employees who are innately motivated to a sufficient degree and therefore will need guidance to impact the variables that are under their control.

Behavioral Approaches for Driving Motivation

People with little knowledge of behavior analysis tend to think of it as a very simplistic approach to influencing behaviors. The field tends to be much more complex than imagined, even when it comes to the issue of motivation. First off, it is important to note that behavior analysts (and

society in general) rarely apply external consequences when behavior is already occurring to a sufficient degree. As B. F. Skinner said during his famous debate with Carl Rogers, our culture objects to "wasting *reinforcers* where they are not needed or will do no good." (Rogers & Skinner, 1956, p. 1058). Perhaps due to the response effort on the part of the delivery agent, the societal status quo (including the practices of behavioral experts) is to reserve mediated reinforcement for situations in which the level of behavior is insufficient, thus rendering many of the concerns regarding the application of unnecessary and detrimental reinforcers superfluous. When the baseline levels of self-motivation are not strong enough to serve the needs of the organization, there are several procedures that can be used to increase goal directed behavior (McGee & Johnson, 2015). In fact, one of the main advantages of conceptualizing motivation in terms of factors that influence goal directed behavior, rather than as a hypothetical construct, is that it makes several behavior improvement strategies more apparent.

There are several antecedent strategies that can increase goal directed behavior, such as task clarification, goal setting, feedback, and process redesign, which are discussed elsewhere in this volume. Another antecedent strategy that is quite important in regards to motivation is the concept of the motivating operation. A motivating operation is a change in the environment that increases the effectiveness of consequences and evokes behaviors that are related to those consequences. Several unlearned examples readily illustrate how motivating operations can make outcomes more valuable. Food deprivation will make food more effective as a reinforcer and will evoke food seeking behaviors. Food satiation will make food less effective as a reinforcer and will abate food seeking behaviors. Salt ingestion will make liquid more effective as a reinforcer and will evoke liquid seeking behaviors. Other unlearned motivating operations include environmental changes related to sleep, oxygen, temperature, activity, sexual stimulation, and pain (Michael, 2004). As powerful as these operations are, unlearned motivating operations are largely irrelevant in organizational settings since

managers cannot legally or ethically manipulate the variables related to these events. Alternatively, conditioned motivating operations—in which the evocative effects are acquired through learning—remain quite relevant for workplace interventions. Two operations with the broadest applicability to OBM, reflexive conditioned motivating operations (CMO-R) and transitive conditioned motivating operations (CMO-T), will be covered here.

Reflexive CMOs involve the presentation of stimuli that are correlated with the onset of some environmental worsening and whose removal will function as reinforcement (Michael, 2004). It may be helpful to think of the CMO-R as a type of warning stimulus about a forthcoming aversive event. One of the most obvious examples involves managers who frequently capitalize on threats to motivate their employees. The threat (CMO-R) is correlated with the onset of environmental worsening (e.g., demotion, public embarrassment, loss of income, termination). The threat also evokes behaviors (e.g., working harder, faster, or more carefully) to remove the same threat. Unfortunately, this motivational strategy tends to be a short-term organizational solution in that CMO-Rs are self-terminating. This is because the CMO-R evokes behaviors that will remove that same CMO-R and once these behaviors are successful, the evocative effect will be immediately removed (i.e., no motivation once the threat is gone). Although a manager could consider constantly re-establishing the CMO-R (i.e., continuously making threats correlated with aversive outcomes), doing so may raise the overall aversive properties of the workplace beyond industry standards, resulting in undesirable side effects (e.g., turnover, sabotage, excessive sick time, avoidance of authority figures).

Some CMO-Rs may involve a time element that results in the evocative effects becoming progressively stronger, such as is the case with deadlines. Most members of society likely have a learning history in which missing a deadline has resulted in some type of environmental worsening created by the social community. Typically, two conditions need to be present for the social

community to apply such aversive control: a) the task was incomplete and b) there is no longer any time left to complete the task. Through enough pairings of these conditions with aversive stimulation, the compound stimulus condition of "task incomplete-no time left" begins to function as a CMO-R. A removal or decrement of either component will weaken the evocative effects of such a deadline-based CMO-R. For example, at the beginning of an interval in which work has been assigned, the evocative effects tend to be weak because there is plenty of time remaining. Likewise, the evocative effects will also be weak if there is little time remaining but the task is nearly complete. However, if the task remains incomplete and time elapses, the current stimulus conditions begin to more progressively resemble the CMO-R and therefore the evocative effects become progressively stronger, typically resulting in the procrastination scallop described elsewhere (Michael, 2004). Just as it may be helpful to think of a CMO-R as a warning stimulus, it may also be helpful to think of a deadline-based CMO-R as a warning stimulus that gradually gets louder over time. The history that develops such patterns of behavior is learned inconsistently across members of culture and therefore is should be expected that there will be great variability in the responsiveness of individuals to deadlines.

Transitive CMOs involve an environmental change where one stimulus (S1) alters the reinforcing effectiveness of another stimulus (S2) and evokes behaviors related to that reinforcer (S2) (Michael, 2004). This is a conditional type of operation, in that the reinforcer becomes valuable in the presence of the CMO-T and stops being valuable in the absence of that CMO-T (technical note: this differs from discriminative stimuli in that this relationship is not based on the availability of reinforcement for responding, just its effectiveness). For example, a pet store employee may be approached by a customer asking for a cichlid fish. The customer request (S1) serves as a CMO-T that makes the stimulus of a fish net (S2) more valuable. The customer request also evokes behaviors related to the fish net, such as searching for the net or asking another employee about the

net's location. Another example of a CMO-T could be seen in a night club where a bartender encounters a drunk and belligerent customer (S1), which would establish the close proximity of the club security (S2) as reinforcing. In the presence of this CMO-T, behaviors related to S2, such as waving a bouncer over or telling another employee to call security, are evoked. A final example could be seen in a restaurant kitchen. Line cooks are able to sample their food to gauge its saltiness whenever they want, but may lack the motivation to do so. One night the restaurant manager institutes a new and ongoing policy stating that from then onwards, he will be randomly sampling the food before sending it out to customers. The notification of product sampling (S1) establishes appropriately seasoned food (S2) as more reinforcing and evokes behaviors such as adjusting salt levels and tasting the food before plating it. Notice that appropriately seasoned food does not become more available, just more valuable. Furthermore, since the evoked behaviors do not remove the policy of managerial product sampling, this does not qualify as a reflexive type of CMO.

Although antecedent changes can be quite effective in motivating performance, so can changes in organizational procedures related to consequences. For example, certain schedules of reinforcer delivery will be more effective than others. Details on specific schedules can be found elsewhere in this volume, but for this chapter it will suffice to point out that the intermittent reinforcement of goal directed behavior will create more resistance to extinction than will continuous reinforcement (D. A. Johnson, Harrell, & Pachman, 1979). With the proper and careful thinning of a reinforcement schedule, behavior can persist with little change in its overall pattern despite extensive durations of unreinforced responses (Ferster & Skinner, 1957: Skinner, 1950). Regardless of the delivery schedule, it is important to ensure that the outcomes actually have reinforcing properties, either through motivating operation manipulations or identifying already effective consequences via the use of preference assessments (discussed elsewhere in this volume).

Establishing Reinforcement for Behavior That Has Never Occurred Before

Even a highly motivated (intrinsically or extrinsically) employee will not automatically be creative, despite popular press suggestions to the contrary. It is important to develop certain aspects of the behavioral repertoire that will be capitalized upon using a properly engineered environment. At this point, it may be worthwhile to distinguish between novelty and creativity. This is a challenging task since definitions of creativity are seemingly endless and easily argued over. However, most definitions of creativity seem to involve two features: 1) the production of a novel behavior and 2) that behavior having value to the society at large (D. Johnson, 2015; Kubina, Morrison, & Lee, 2006). As such, novelty involves instances of behavior that are sufficiently different from previously emitted behavior, whereas creativity further involves novel behavior that is valued by the social community. Sometimes creativity is further distinguished between minor forms of creativity (response variability, rule following, imitation, etc.) and major forms of creativity (when controlling variables are not easily observed by others).

It may also be useful to distinguish between three general types of learning: psychomotor, simple cognitive, and complex cognitive (Sota, Leon, & Layng, 2011; Tiemann & Markle, 1990). Psychomotor learning involves the differentiation of responding without reference to any particular controlling stimulus. For example, the motion of twisting a tool or acquiring the unique movement of vocal musculature to produce a particular pronunciation would fall under psychomotor learning. Simple cognitive learning involves the development of discriminative control over responding so that reliably trained relations emerge. An example of this would be recognizing a customer cue as an antecedent to deliver a scripted sales tactic. Complex cognitive learning involves the extension of behavioral relations to novel controlling variables that were not directly trained. For example, pulling together several previously trained behaviors and customizing them to the demands of a new type of customer. The novel extensions seen within the last category is where the desired forms of creative

behavior are found, but that doesn't necessarily mean the complex cognitive skills should be the first target for intervention. This is because learning lower-order skills can foster the emergence of advanced higher-order skills, especially if the skills are developed to fluency. Developing psychomotor skills to a fast and accurate level of proficiency will make the acquisition of simple cognitive skills more likely, just as mastery of simple cognitive skills will help with the acquisition of complex cognitive skills. Fluency with all skills at each of the levels will make it more likely the individual will combine and recombine behavioral components to produce novel patterns of behavior when placed in situation requiring creativity (K. Johnson & Street, 2004). If the trained repertoires are well selected, the potential is tremendous for countless novel extensions (Alessi, 1987), some of which will be trivial and some of which will be of great practical value.

The benefit of establishing diverse components to fluency within the employee's repertoire can be seen with research related to the interconnection of repertoires and contingency adduction (Kubina, Morrison, & Lee, 2006). With both types of learning, the individual is placed in a situation that necessitates a novel pattern of behavior. To successfully meet this demand, previously established knowledge, skills, or abilities are recruited and combined into novel behavior patterns in service of a similar reinforcement contingency (interconnection) or in service of a completely different reinforcement contingency (adduction). With both phenomena, key skills are trained to fluency and the training of these component skills may even be separated across great lengths of time. The observed process for such prior training may involve a slow and gradual acquisition of new skills that is fairly well understood by the general public (i.e., keep practicing until mastery). When facing an unfamiliar situation necessitating a behavior pattern that had never been emitted before, the previously discontinuous skills are then rapidly combined into a new successful composite pattern. If an observer was ignorant of the previous training of the separate component skills, the occurrence of the composite pattern would likely be ascribed to mentalism (e.g., "the

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solution was suddenly perceived in the mind"), quasi-magical processes (e.g., "the solution just came from out of nowhere"), or a satisfied appeal to ignorance (e.g., "the amazing thing about creativity is how mysterious it is"). Such explanations are antithetical to engineering new instances of novelty and will likely lead to wait-and-hope types of interventions. The behavioral conceptualization provides an alternative and pragmatic formulation in which skills thought likely to be relevant to a solution can be trained to fluency and the individual can be placed in situations that warrant new combinations of old skills.

Experimental work done by Epstein, Kirshnit, Lanza, & Rubin (1984) can provide an example of this type of sudden emergence of useful novelty. In their replication of Köhler's (1925) famous chimpanzee insight demonstration, pigeons were placed in a chamber containing a small box on the ground and a plastic banana suspended out of the pigeon's reach. Pecking the banana would produce food reinforcement, but not if the pigeon jumped or flew towards the banana. To be successful under these circumstances called for a pattern of behavior never seen before by the pigeons, in that they would have to move the box underneath the banana, climb the box, and then peck the banana for food (roughly analogous to the situation that confronted Köhler's chimpanzees). Some pigeons solved this problem readily whereas other pigeons never solved it. The critical variable determining success or failure was the pre-existing repertoire of the pigeons. Some of the pigeons had histories that firmly established three component skills to fluency: 1) directional pushing of a box, 2) climbing a box while pecking a banana, and 3) extinction of flying and jumping in the presence of the banana. These skills were never chained together during training, but interconnected into a complete and successful behavior pattern during the test situation. Any pigeons who were trained on some, but not all, of the three component skills failed to produce the creative solutions. Although this study involves animals in a controlled setting, the fundamentals of combining previously established repertoires with new demands remains just as relevant for

organizations needing to engineer innovations on the part of employees. For example, an employee may create a novel proposal for a mobile app well-suited for the current market demands by combining skills acquired in their past education and their experience with divisions related to those markets. A repertoire that was deficient in any of the relevant skills would have prevented the production of the creative idea.

Not only is the employee's history relevant to the production of a creative solution, but the current environment is also equally relevant. Changes in the current environment will alter the probability of the appropriate solutions being emitted. Either management or the employees themselves can make these alterations. The notion of individuals rearranging their own environments is a major element in a behavioral approach to problem-solving (Robbins, 2011; Skinner, 1953; Tiemann & Markle, 1990). This is because in the process of arranging and rearranging features of the surrounding environment, new supplementary sources of stimulation begin to exert stimulus control over successful solutions. For example, a copywriter unable to develop a viable marketing slogan may begin to read new books or take a walk while eavesdropping on the surrounding conversations. The exposure to new sources of stimulation may evoke a response that was weak in the previous environment and the copywriter suddenly has an "insight" of the perfect slogan for the advertisement.

As discussed elsewhere in this volume, behavior has many different dimensions that can be targeted for intervention, such as frequency, duration, quality, timeliness, and more. Novelty and creativity can also be considered dimensions of behavior and reinforcing outcomes can be made contingent upon such behaviors (Eisenberger & Cameron, 1996). Although some authors have warned that extrinsic incentives tend to narrow behavior so that creativity is excluded (Pink, 2009), it is important to note that many of the studies showing detrimental effects of external rewards upon creativity were studies that targeted productivity alone (Lepper, Greene, & Nisbett, 1973). However,

when researchers differentially reinforced original instances of behavior, novel performances were found to increase (Byron & Khanzanchi, 2012; Eisenberger & Armeli, 1997). If a manager wants creativity, it is important that the manager pays for creativity; not pay for some other dimension of behavior while hoping for creativity. The announcement of stated policies to target creativity may serve as a motivating operation to establish novel response products as reinforcing. If creativity is exclusively targeted, it may be possible that a performer will spend extensive periods of time emitting novel behavior without reinforcement. This is because creativity depends upon the values of the social community, not just the individual's performance, and what will be valued is often not explicitly known to either the performer or the social community itself in advance. This can be corrected for by either targeting novelty instead of creativity or by establishing a reinforcement history that results in a high resistance to extinction. The latter approach may be advantageous in capitalizing upon the principle of resurgence (Epstein, 2015). Resurgence involves the emittance of previous forms of behavior when recent forms of behavior are no longer reinforced. Resurgence often produces novel variations, combinations, and extensions of previously reinforced behavior and these new patterns of behavior may represent desired forms of creativity to the organization.

Interconnecting the Previous Components (Summary Guidelines)

Even if the conceptual digressions above are beyond the interests of a manager, the practical guidelines that emerge remain relatively straightforward and practical. Managers interested in engineering a workforce that persistently works towards innovation would do well to consider the following practices:

- Personnel selection and training should ensure employees have fluency with knowledge, skills, and abilities suspected to be components of the innovative needs. Of course, since innovation may involve outcomes presently unknown to the company, it may be important to be generous with the inclusion of components suspected to be relevant to a solution. The

more diverse these components are, the more likely that interconnections and extensions can occur that will be of value to the organization. Building fluency efficiently may require careful behavior-based instructional design (D. A. Johnson, 2014; Markle, 1990; Tiemann & Markle, 1990) and training (Brethower & Smalley, 1998).

- Valuable innovation will require many creative failures, so it is important to engineer persistence through intermittent reinforcement and to minimize aversive consequences for errors to offset the effects of punishment.

- Novelty and/or creativity should be directly and explicitly targeted as a dimension of behavior for reinforcement. Whether done through motivating operations or preference assessments, it is important to ensure organizational rewards actually have reinforcing properties.

- Frequently rearrange the environment (through employee or managerial initiatives) so that novel sources of stimulus control can evoke creative behaviors that would otherwise be weak.

- Pair the response products of creative endeavors with reinforcing stimuli. If done correctly, novel response products themselves will serve as automatic reinforcement. This may help facilitate novel performance during times when social mediation is not possible.

- Do not expect intrinsic motivation to be sufficient for creativity, even if explicitly depending upon automatic reinforcement. Behaviors of interest to the organization will not continue perpetually in the absence of external consequences, even after arranging for a very thin schedule of reinforcement. Occasional re-pairing procedures will be needed to maintain behavior in the long run (Conard, Johnson, Morrison, & Ditzian, 2016; Malott, 2001).

Although this list is a useful starting point for practitioners, much remains to be discovered. In order to continue proving the relevance of behavior analysis and OBM for higher order skills, researchers are strongly encouraged to tackle this fertile and complex area.

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