Contemporary trends in psychology.

1st basic Education.

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English program.

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Chapter 1

Cognitive overload theory

What is cognitive overload?

Cognitive overload is a common phenomenon in today's fast-paced work environments where employees are bombarded with vast amounts of information and tasks to handle. It can be defined as the point at which the working memory becomes overwhelmed with too much information, leading to a decrease in productivity and performance.

Use this guide to dive into the causes and effects of cognitive overload, identify examples, and discover solutions to help employees overcome it.

Cognitive overload is a state of mental exhaustion that occurs when the **demands placed on working memory exceed its capacity**. Working memory is the part of the brain that holds and manipulates information temporarily while performing cognitive tasks. When the amount of information exceeds the capacity of working memory, it can result in decreased performance, difficulty concentrating, and other negative outcomes.

In a professional setting, **cognitive overload can occur when employees are required to manage multiple tasks, responsibilities, or projects at the same time**. It's especially common for employees who work in high-pressure or fast-paced environments, such as healthcare, customer service, or emergency services.

Cognitive overload can also occur when employees are learning new, complex skills, or working with unfamiliar technology or systems. **Managing cognitive overload is crucial when you are onboarding new hires, or delivering training** on new skills or processes.

What is the primary cause of cognitive overload?

The primary cause of cognitive overload is an excessive amount of information or demands placed on working memory. This can occur when employees are required to manage multiple tasks simultaneously, process complex information, or work with unfamiliar technology or systems.

Cognitive overload can also occur when employees are required to work for long periods without breaks or when they are under significant stress or pressure.

These four main causes can be broken down to the following:

1. **Multitasking**
   Contrary to popular belief, multitasking isn't always a smart way of working, and is actually a significant cause of cognitive overload. Trying to complete multiple tasks at once can lead to decreased productivity, as the brain struggles to switch between tasks.

2. **Information overload**
   Employees are continually bombarded with vast amounts of information through emails, social media, and other digital channels. Trying to process all this information can lead to cognitive overload.

3. **Poor time management**
   Employees who struggle with time management might procrastinate important tasks, leading to a situation where employees have too much to do in a limited amount of time.

4. **Complex tasks**

   Complex tasks that require a lot of cognitive resources can lead to cognitive overload if employees are not adequately trained to handle them.

What are the effects of cognitive overload?

Cognitive overload can have various negative effects on employees and the workplace, including:

1. **Decreased productivity**

   while different employees will have different capacities for how many responsibilities they can handle, every employee has a breaking point where their productivity declines due to having too many projects to execute.

2. **Burnout**

   Continual cognitive overload can lead to burnout, a state of physical, emotional, and mental exhaustion that can result in decreased job satisfaction and motivation.

3. **Poor decision making**

   When there are too many moving parts and not enough time to consider options, it's only natural that employees might end up making poor decisions on the spot as a result of cognitive overload.

What does cognitive overload look like?

Cognitive overload symptoms can vary depending on the individual and the situation. However, some common signs include:

1. **Difficulty concentrating**

   Employees may have difficulty focusing on tasks due to the amount of information or

demands placed on working memory.

2. **Forgetfulness**
   when employees have too many things to remember simultaneously, it's inevitable that they may forget important details or deadlines.
3. **Feeling overwhelmed or anxious**
   Stress is a natural response to cognitive overload, and it's important that managers help employees manage their workload to prevent turnover in the company.

How do you overcome cognitive overload?

Every job comes with its stress and it's important for employers to have realistic expectations and create processes that run as smoothly and efficiently as possible. Leaders in the company have a responsibility to eliminate roadblocks and support employees in their day to day. They can help prevent cognitive overload for their teams by:

1. **Prioritizing and simplifying tasks:** When assigning tasks to employees, managers should provide clear priorities, as well as break down tasks into reasonable steps and milestones. By providing smaller, specific objectives large projects will appear much more accomplishable, and less daunting.

2. **Allowing for regular breaks:** Encouraging employees to take short breaks a few times a day can help dramatically reduce stress levels. Even better if physical activity or relaxation techniques are incorporated into these breaks.

3. **Leveraging micro learning**: When you have new information to present, consider taking a micro learning approach and breaking down your content into smaller, bite sized pieces

that are easier to comprehend and remember.

4. **Providing support and resources:** Creating a supportive and healthy work environment goes a long way in reducing stress and cognitive overload. This can include time management tools, access to training and development opportunities, and regular check-ins to ensure employees are not overwhelmed.

Types of cognitive load

1. **Intrinsic Cognitive Load**

Intrinsic cognitive load is a necessary component of learning over which we have no control, and refers to the difficulty of the material being learned, regardless of how this information is presented. If the intrinsic quality of the material being learned places a high demand on a learner's cognitive resources, this is referred to as cognitive load. The amount of work required of a person is determined by the difficulty of the task set or topic being taught, as well as the learner's capacity to comprehend the new knowledge.

When studying complex theories, the problem-solving skills required to discover a derivative will be the same regardless of whether you are presented with the subject properly or not. Your brain must still use a combination of long term memory, short term memory, and strategic cognition to solve the problem. The ease with which an inherent cognitive load may be processed will remain constant independent of external variables.

2- Germane load

A germane cognitive load is the manner in which an individual uses their memory capacity and inherent intellect to construct mental models. Mental schemas are mechanisms that the brain employs to address a variety of difficulties posed by various sorts of load. This sort of cognitive load occurs when your brain creates a learning process for assimilation and application of new

knowledge.

The first time we encounter something new can be intimidating, as we lack a schema that informs us of what to expect. As we observe and learn about the experience, a germane cognitive load is generated to assist us in anticipating and understanding it in the future.

3- Extraneous Load

When ineffective or distracting teaching methods may be used, the learning experience is made needlessly tough or complex, as it diverts cognitive resources away from the learning activity, resulting in unnecessary cognitive burden.

Certain types of information may be better understood through the use of mind maps, illustration, models or videos. For example, utilising models or diagrams would be more effective for teaching students anatomy than reading from a textbook.

How can I avoid cognitive overload

- Cognitive overload can be addressed in a few different ways. First, ask questions of the learner to ascertain where their knowledge level is to ensure you are not teaching at an inappropriate level. Second, work to eliminate extraneous distractions, such as cell phones or other devices that may be overstimulating the learner. Third, try to focus the learner on one piece of information or task at a time. Consider the amount of time that you can give learners for the task. Being clear about how long something may take can help reduce the overload (think of a time estimate for reading materials).

Chapter 2

Cognitive agility

Defining Cognitive Agility:-

Cognitive agility is the extent to which we adapt and shift our thought processes when doing so leads to more positive outcomes. The easiest way to understand and recognize cognitive agility is to see it in action in the real world against the backdrop of challenge and change. In this way, we can better understand what it is and learn why some people are able to adapt and grow during tough times while others get stuck.

Cognitive agility is not about being set in our ways or rigid in our thinking. It involves a continuous process of learning and growth, where we actively seek out new information and experiences. By doing so, we expand our cognitive abilities and become more adaptable to change.

Imagine a person who is resistant to change and clings to their established beliefs. They may struggle when faced with unexpected situations or new information that challenges their worldview. In contrast, someone with cognitive agility approaches these situations with curiosity and an eagerness to learn. They are open to reevaluating their beliefs and adjusting their thinking accordingly.

By Darren Good and Bauback Yeganeh :

Change and complexity continue to increase within organizational contexts. Scholars and practitioners have increased support of leader development initiatives to meet these environmental demands. They have strongly advocated terms such as adaptability, flexibility, and resilience as skills and abilities required for success in the modern business world. While many leadership training and development practices aim to build aspects of adaptability, most focus on competency development and neglect how to manage the mind within dynamic conditions (Kimball & Holyoak, 2000). Learning to adapt within the dynamic current of a real-time task is important, as outside

influences continue to transform seemingly static situations into complex environments. This article seeks to address such conditions by focusing on real-time adaptation within dynamic decision-making tasks. We suggest *cognitive agility*—the individual capacity to mindfully practice openness and focus, as a skill to meet these demands.

Real-Time Adaptation

Adaptability is a skill of adjusting productively to change in the environment. In most cases scholars and practitioners examine adaptability by observing performance adjustments across tasks, over stretched periods of time. For instance, they often discuss adaptive performance in relation to a new role at work, the integration of a new technology, or changing business priorities (Pulakos, Arad, Plamondon, & Donovan, 2000). Yet with unprecedented increases in change and information, even predictable tasks now change in real time.

Take Jacob for instance, a media director at a web-based advertising solutions company. He runs a weekly team meeting with his six account managers. In the meeting, each of these account managers are connected to external sources of information by wireless handheld devices, thus increasing the number of inputs and potential uncertainties. The account managers serve as representatives to an array of client systems, each under massive pressures in dynamic and uncertain markets. As a result, the complexity and constant access to real-time information impacts the course of the meeting. Jacob must make sense of all this while filtering it through the strategic lens of the organization. This requires him to explore new opportunities and drive existing strengths en route to improved customer service. So while it is true that Jacob must adapt to the turbulent environment of the new media marketplace, he must also adapt to the ongoing dynamism that exists in the meeting. He has to use available information while maintaining a coherent process. How does he do this? How does he become better at managing within such a context? This is just one of many daily scenarios that leaders at all levels confront. It presents a need to focus on real-time adaptation in a dynamic context.

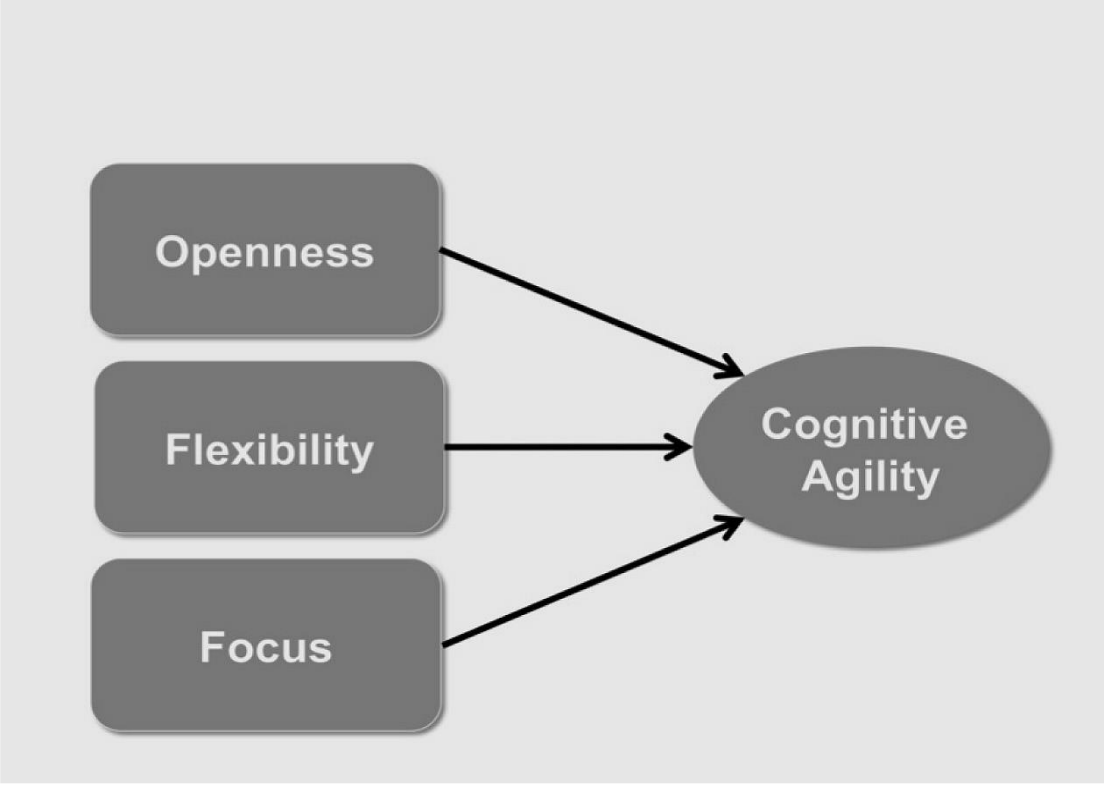


Figure 1: cognitive agility

There are three variables that form cognitive agility (see *Figure 1*). Each is necessary in order to carry out the smooth and frequent transition between looking for new information and staying focused. We categorize the first two variables, focused attention and openness, in terms of perceptual and conceptual attention (see *Table 2*). Perceptual attention is the degree to which people consider a wide range of stimuli in the environment (Posner, 1987), while conceptual attention is the extent to which people approach a wide range of concepts (Martindale, 1995).

1- **Focused Attention** is the capacity to oppose incoming distraction. Focus is associated with narrow perceptual attention (e.g., focusing the 5 senses on a particular thing) and narrow conceptual attention (e.g., focusing on specific streams of information). For example, Jacob may keep his meeting on track by redirecting (focusing) the team's attention to the agenda.

2. **Openness** refers to noticing and searching for new information in the environment. It is associated with a wide breadth of perceptual attention and the willingness to follow new threads of data (conceptual attention). It brings together and synthesizes terms such as mindfulness, curiosity, creativity, and novelty seeking. For instance, while running the meeting, Jacob exercises openness to scan the room for various sources of information, which can be used to support the flow of the meeting.
3. **Cognitive Flexibility** describes the capacity to switch mental activity in favor of what is more appropriate. In DDM

environments it is very easy to get stuck in the use of a single strategy. Most people tend to repeat what they are used to in the face of difficulty. This can be a particular challenge for experts, as they tend to become entrenched in how they approach familiar parts of a task (Dane, 2010). Flexibility is a necessary skill in order to quickly and effectively shuttle between being open and focused.

Cognitive agility characteristics:

1. The ability to maintain highly focused situations.

Those with cognitive agility have the ability to increase emotional intelligence by improving the individual's ability to switch between highly focused situations to levels of broad external awareness that would enable dynamic decision-making and enhance interpersonal communication skills.

2- The cognitively agile is more capable of exploiting new opportunities.

3- Cognitively agile has the ability to use perceptions and experiences and make judgments about what happened in the past and is happening in the present to help guide future decisions.

4 - More capable of differentiation and integration, differentiation means the ability to perceive multiple dimensions instead of just one, while integration refers to the ability to identify relationships between the different characteristics of situations.

5- More ability to see others from a contradictory perspective, and better ability to absorb contradictions, which is an indication of social cognition skills that enable them to interact skillfully with others (Al-Badawi, 2021: 20)

Chapter 3

Mental capacity

mental capacity. At this point, you need to know how to describe this notion of 'mental capacity'. You could think of mental capacity as the maximum amount of mental work one can perform at any particular instant. However, you now need to explain the concept of 'mental work'. What we need, therefore, are some theoretical concepts which can be used as an accepted foundation from which to build an explanation of mental events. To describe and explain ideas like 'mental capacity' and 'mental work', we require as a starting point theoretical frameworks which can be used to talk about the types of mental events that mediate between the sensory analysis of a stimulus and the behavioural response that the stimulus evokes.

The work of psychologists such as Broadbent (1958) in the study of attention (to be discussed in Section 2) and Neisser (1963) in the investigation of visual search (to be discussed in Section 4) has led to the view of the brain as an **information-processing system**. That is, mental events can be explained in terms of a model of the brain in which information is transmitted (as in a telephone system) and processed (as in a computer). Broadbent and Neisser argue, along with many other psychologists, that *information processing* provides a suitable framework for explaining notions such as 'mental work' and, thus, can be used as a basis for explaining our attentional abilities. In applying the information-processing framework to the understanding of mental events, psychologists began with a very simple model of how information flows through the brain. Such a model is illustrated in Figure 11.1.

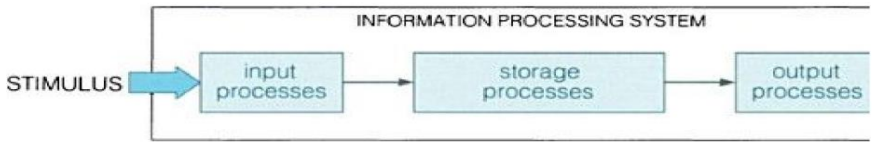


Figure 11.1 The information-processing model

In Figure 11.1 three stages of processing have been distinguished: **input processes** concerned with the perception and sensory registration of stimuli; **storage processes** concerned with elaborating, manipulating, selecting and storing this information; and **output processes** which produce the appropriate responses. The basic idea underlying the system depicted in Figure 11.1 is that mental processes are conceived of as processing information in the brain, analogous to the way information is processed by a computer. External stimuli impinge on the different senses which then convert the various forms of energy (light, sound, etc.) into information about the

nature of the external environment (see Chapter 10). Using the example of driving, the *input processes* transform the light and sound received by the eyes and ears into visual and auditory information about the driving situation.

The information supplied by the input processes is then passed to the next stage of processing, the *storage processes*. It is at this stage that the system must *select* from the wide range of sensory information those aspects that will receive further processing. We cannot attend to *every* aspect of the driving situation, so we focus on those sensory cues that are important for safe driving. One special set of processes that operate at this stage is concerned with the storage and retrieval of information in memory. In driving, we constantly draw on the information stored in our memories, to perform activities such as interpreting traffic signs, remembering where we are going, and deciding on the most appropriate driving action for the conditions. One of the main goals of this stage of processing is to create the information necessary for producing an appropriate response. This information is passed to the last stage of processing, the *output processes*. The output processes retrieve from memory appropriate motor patterns (that is, patterns of activity in the brain that control the activity of muscles or glands). These are manifest as behavioural responses. For example, these output processes are responsible for creating an appropriate sequence of driving actions, such as steering and changing gear.

Figure 11.1 illustrates two important notions. First, mental activity is conceptualized as the processing of information by the brain. Second, mental activity can be broken down into different **stages of processing**, the sequence of stages defining the overall flow of information in the brain. The information-processing framework allows us to examine each stage of processing in detail, identifying sub-stages and sub-processes with precision. Within such a framework, we can now start to think about how we can explain human attention.

Psychologists began by looking at attention as a problem of information transmission. The central stage of processing in Figure 11.1 cannot cope with the whole flood of information passed from the input processes. Some form of **attentional process** is necessary to *select* certain inputs for processing at later stages. That is, certain inputs are transmitted through the system and evoke appropriate responses, while others are discarded and fail to get beyond the input-processing stage. Psychologists adopted the more specific information-processing analogy of the brain as a **communication channel** to emphasize the **flow of information** through the system.

- There are two facets of human attention: focused (selective) attention and divided attention. Focused attention refers to the ability to focus our attention on a particular stimulus or task. Divided attention refers to the ability to divide our attention across two or more tasks.
- Information-processing models provide an explanatory framework for describing and explaining mental activity, in terms of the transmission and manipulation of information.
- The information-processing approach analyses mental activity as a sequence of processing stages, and distinguishes between three main categories of processes: input processes, storage processes and output processes.
- Attention is necessary for selecting those sensory inputs, or communication channels, which are to be transmitted to later stages of processing.

2 Bottleneck theories of selective attention

The first theories of human attention were based on the *communication channel* model. According to this view, the **sensory organs** transform sensory inputs through channels of information. In the simplest version of this model, each independent sense organ is regarded as a separate information channel. The information processed by each ear is regarded as constituting two *separate* channels. However, the information provided by the eyes corresponds to a *single* channel because one can never distinguish the inputs to the separate eyes, except in the trivial case of closing one eye.

The later stages of processing cannot cope all at once with all the channels of information generated by the sense organs. A *bottleneck* occurs at the point where the input processes feed their information into the next stage. The simplest model assumes that only one channel of information at a time can be processed by the later stages. To overcome this bottleneck, some form of **selection mechanism** is required which allows through only one channel at a time for further processing. The class of theories based on the communication channel analogy are referred to as **bottleneck theories** because they all assume the presence of a bottleneck somewhere in the flow of information. One of the earliest bottleneck theories was developed by Broadbent (1958).

Mental Capacity is being able to make your own decisions.

- **<u>Someone lacking capacity cannot do 1 or more of the below:</u>**

  1. Understand information shared with them about a decision.
  2. Retain the information long enough to be able to make a decision.
  3. Weigh up the available information in order to make the decision.
  4. Communicate their decision.

The aim of MCA is to also protect the rights of individuals by creating a framework for decision making i.e., advocacy. Where someone may lack the mental capacity to decide for themselves.

<u>There are a number of reasons why a person may lack capacity, for example:</u>

•Dementia

•Learning Disability

•Brain Injury

•Mental Health Condition

•A stroke

•Unconsciousness due to an accident/injury

•Substance abuse

Executive Capacity:

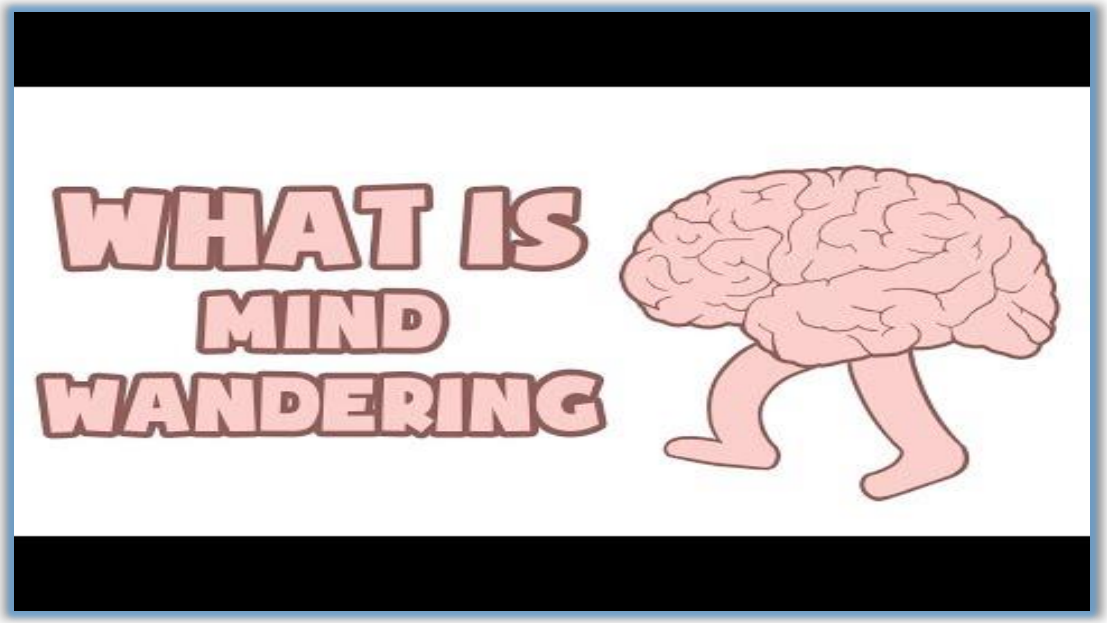
Refers to the ability to transfer their understanding of information to real-life settings and to act on their intentions. It is important to consider this ability, in addition to mental capacity e.g., where a person is at risk of self-neglect.

Chapter 4

Mind-wandering

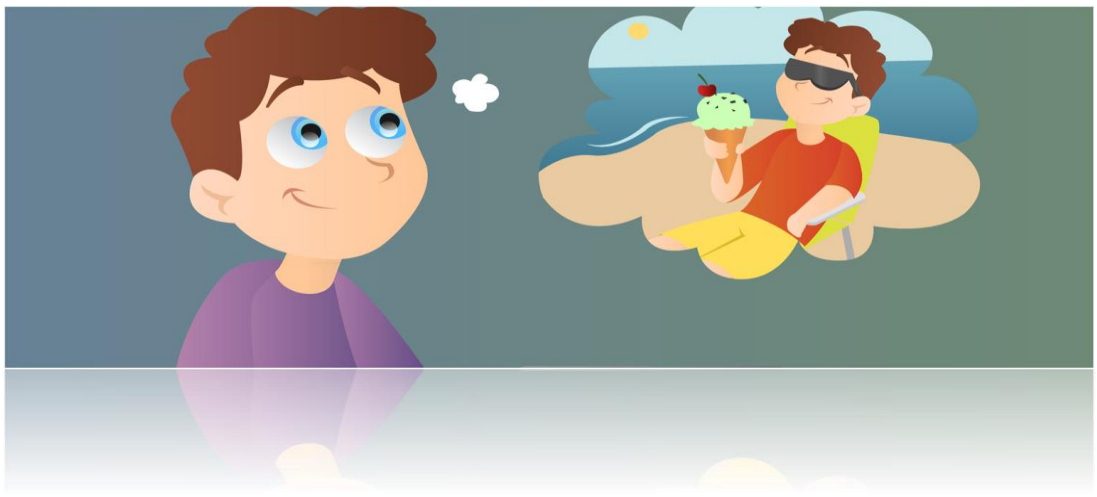
What is mind wandering?

To know more about mind wandering, let's see the video:



Mind-wandering is a psychological process involving the emergence of spontaneous thoughts in daily life. Research has shown that mind-wandering influences diverse psychological outcomes; however, less is known about possible individual differences that may drive mind-wandering. In this study, we argue that personality traits, expressed in neuroticism and openness to experience, may lead to the individual's self-perception of their mind-wandering activity, due to meta-awareness processes. In a three-wave survey study with 273 college students, we gathered data which supported a positive association of both neuroticism and openness to experience with mind-wandering self-perception, mediated by the individual's meta-awareness.

Thus, this study contributes to the literature on spontaneous thinking by showing that mind-wandering processes may be a function of individual differences expressed in personality traits.



Introduction

Mind-wandering refers to the shift from events in the external environment to internal, self-generated thoughts, implying that attention is focused on the inner thoughts and feelings (Smallwood and Schooler, 2006). In the last two decades, this cognitive process has been extensively studied, such that the existing research shows that mind-wandering is highly prevalent in our daily life (Killingsworth and Gilbert, 2010; Kane et al., 2017), having influences on different psychological outcomes. For example, getting lost in our thoughts could worsen performance in tasks requiring concentration, whereas the same process can increase creativity (Smallwood and Schooler, 2015).

However, other psychological processes associated with spontaneous thinking have been less examined, such as the case of mind-wandering self-perception, namely, the extent to which individuals are aware of their mind-wandering episodes (Schooler, 2002; Chin and Schooler, 2009; Seli et al., 2017). For example, think about when, while reading an entire page of a book, suddenly, you discover you were lost in your thoughts and not paying attention to the printed words you have been scanning. This mind-wandering self-perception is scientifically interesting and should also have practical implications. For example, if the individual is conscious of his/her wandering moments, s/he might use the awareness of mind-wandering to improve performance or mitigate its possible downsides, for instance, increasing concentration on constructing the meaning of the text in the reading example.

Thus, a relevant question is what psychological factors lead to mind-wandering self-perception.

People are often told that humans are social animals, so it is a surprise to consider that often what goes on in the private mental lives of people is most interesting to psychologists. Mind-wandering is an interesting psychological phenomenon for just this reason: It is a uniquely human act, it is an essential part of a person's internal world, and it is an experience that all readers will immediately recognize. Moreover, mind-wandering occurs in almost all circumstances, throughout the life span, and, in all cultures, suggesting that it is a universal part of the human condition. Despite the clear importance of mind-wandering to humans, psychologists are still relatively ignorant about mind-wandering relative to other aspects of social psychology.

One reason for the relative ignorance about mind-wandering is because the nature of the experience often falls outside the boundaries of phenomena considered important by mainstream psychology. The assumptions of the work of behaviorists in the 20th century provide a clear example. Behaviorists often assumed that, first, the data of psychology should be based on observable facts rather than on the introspective evidence that had formed the focus of research in the previous century, and, second, that applying principles of learning was essential to understanding psychological phenomena.

Mind-wandering is a clear candidate for neither—it is private experience and so accessible only through introspection. Moreover, because of its privacy, mind-wandering is an experience that is specifically unrelated to the learning that occurs in the environment.

In the 1960s, it became clear that the models of psychological functions based on the behaviorist account were too simple. The cognitive revolution, which occurred in response to these simple models, emphasized the importance of internal cognitive states in determining human behavior. Despite the pioneering work of Jerome Singer and John Antrobus, who developed reliable techniques for measuring private experience, the mainstream of cognitive psychology remained reluctant to embrace mind-wandering research. Many cognitive psychologists felt that these states were best measured by the use of objective measures such as response times, rather than through verbal reports as is the modus operandi for mind-wandering. In addition, many researchers were put off because of researchers' lack of ability to manipulate— switch on and off mind-wandering—preventing the ability to draw causal conclusions.

The When and Where of Mind-Wandering?

Most psychologists would probably agree that mind-wandering occurs most often in simple tasks with few interruptions. It is common, for example, to notice mind-wandering while reading or driving on an empty freeway. Similarly, people who engage in meditation will—all too clearly—recognize the rapidity with which attention can switch away from their breathing to their thoughts. These instincts are borne out by research. In the 1960s, research demonstrated that mind-wandering showed an inverse linear relationship with the time between events in a task. That is, the more targets in a block of a task, the less likely the participants were to report mind-wandering.

Mind-wandering is also frequent when people don't need to hold something in mind. This was demonstrated in a study in which participants either held a number in mind for a short interval, before saying it out loud, or simply repeated the numbers out loud immediately upon hearing them. Mind-wandering was reported less often when people had to remember the numbers for these very short intervals than if they simply repeated them. The act of holding information in mind involves working memory, and so it has been suggested that mind-wandering is suppressed by tasks involving working memory load.

These simple information-processing influences, however, do not do justice to the other main influence on the experience of mind-wandering. A quick review of your last enjoyable visit to the cinema or consideration of the

last good book you read clearly indicates that often one's mind wanders least when one is interested, intrigued, or absorbed. One study examined the relation between mind-wandering and interest. Participants read a number of texts, selected on the basis of either interest or difficulty. During reading, participants were less likely to be off task when reading interesting, but not difficult, text. When reading dry expository texts (like a social psychology textbook!), the lack of an absorbing narrative meant that participants had to resort to being vigilant regarding their own lapses to ensure they stayed on task.

Types of mind wandering

There are two types of mind wandering — each with a different experience. Mind wandering tends to be seen in a negative way, but zoning out on purpose can help creative thinking and problems solving.

Research has identified a vital difference between intentional and unintentional mind wandering. It reveals how intentional mind wandering feels different from accidental mind wandering.

The study's authors explain:

"We suspect that when people are completing an easy task, they may be inclined to deliberately disengage from the task and engage in mind wandering.

This might be the case because easy tasks tend to be rather boring, or because people realize that they can get away with mind wandering without sacrificing performance.

Conversely, when completing a difficult task, people really need to focus on the task in order to perform well, so if they do mind-wander, their mind wandering should be more likely to occur unintentionally."

Intentional daydreaming

Some types of mind wandering may be highly beneficial to our brains, and our futures.

Intentional daydreaming is linked to a thicker cortex (a good thing) in certain key areas of the brain, research finds.

Directing the mind to wander is a cognitive skill that can be beneficial in some contexts. For example, it can allow us to mentally rehearse upcoming events, or solve problems we might encounter. In other words, it allows the brain to work out possible futures for us.

So, mind wandering is not always a failure of self-control that is inevitably linked to mistakes.

Chapter 5

School burnout

BURNOUT is proposed as a concept by Freudenberger for the first time (1974). The concept of burnout is conceptualized as a composition of long-term emotional burnout, physical fatigue, not participating in business, removing those receiving service from humanity and low business success. Freudenberger created burnout syndrome as a result of the studies he gained from his clinical experience. In this context, it has been concluded that burnout is widely seen in the service sector and in occupational groups where face-to-face service is provided. However, it was later observed that the burnout was also observed in the blue-collar workers, called the working class (Pines and Aronson 1988). Later on, the concept of burnout was defined as a three-dimensional structure in the form of emotional burnout, desensitization and personal failure and a measurement tool (Maslach Burnout Inventory) was developed in this direction (Maslach and Jackson 1986, Hobfoll and Shirom 2001).

School Burnout

Although the concept of burnout was addressed as a workplace-related concept in the early times and it has also been studied by being adapted to educational contexts by Educational Psychologists (Fimian and Cross 1986, Schaufeli et al. 2002, Jacobs and Dodd 2003, Noh et al. 2013). According to the researchers, schools also have some demands from students such as being successful or the best and these demands make students feel under pressure (Salmela-Aro et al. 2009). Depending on this, school burnout is treated as a state of tension observed in situations where the student cannot meet the educational expectations of himself/ herself or someone else (Frydenberg and Lewis 2004, Salmela-Aro et al. 2009, Barnett and Flores 2016). It has been seen that the results of studies on school burnout are similar to employee burnout (Pines et al. 1981). Some of these results are depression, absenteeism, and dropping out of school (Fimian and Cross 1986, Covington 2000, Frydenberg and Lewis 2004, Yang 2004, Salmela-Aro et al. 2009). Therefore, it is important to examine the causes and consequences of school burnout (Parker and Salmela-Aro 2011).

It is stated that school burnout has negative consequences and risk factors related to physical and mental health. In particular, the negative school environment and low academic achievement are associated with school burnout (Salmela-Aro et al. 2008). Studies conducted similarly have shown that especially weak relationships within the family and emotion-focused coping increases the risk of school burnout and which in turn lead to anxiety and school dropout later on (Silvar 2001). School burnout often emerges due to a mismatch between the performance standards that the student sets for himself or herself and the actual performance he or she shows at school (Kiuru et al. 2008). For this reason, it is stated that the difference between the situation they expect to be and the one that they are actually in or where they are carries the risk leading to school burnout (Walburg et al. 2016).

Burnout is often described as a three-dimensional structure in the literature. These dimensions include emotional exhaustion, depersonalization, and lack of personal accomplishment or sense of low personal success (Maslach et al. 2001). Exhaustion from these dimensions leads to the feelings of chronic fatigue and uneasiness. Depersonalization is a person's losing his or her interest in the work that he or she is doing and finding it meaningless. The decline in the feeling of personal accomplishment or inability dimension is expressed as a decreased sense of competence and success. For this reason,

burnout is seen as a major risk factor for many professions and students and it is stated that the burnout is likely to result in depression in the long term. Along with depression, school burnout also brings along low self-esteem and suicidal risk (Walburg 2014).

School burnout is regarded as a form of reaction emerging in dealing with the academic stress that especially experienced by students in the long-term school life. In this context, it is accepted that there is also a three-dimensional structure in school burnout as it is in employee burnout. These dimensions are exhaustion at school, cynicism to the meaning of the school and sense of inadequacy at school (Luo et al. 2016). This situation which is observed in the students leads to some negative results in a developmental sense. Especially school burnout is a feature related to low academic achievement, anxiety, depression, psychological problems, truancy, absenteeism and school dropout (Yang 2004, Bask and Salmela-Aro 2013).

School burnout is associated with school and is being studied as a long-term stress. The studies report that about 10% of adolescents are faced with problems due to school burnout in Finland. Along with that, it is stated that especially the students with success orientation have more school burnout than the students with mastering orientation (Salmela-Aro et al. 2009).

It is stated that high school students who have academic field education have higher levels of school burnout than those who are educated in vocational high schools. This is linked to the test stress of the higher test scores especially required in transition to academic high school. It is also stated that male students who are getting an education in these high schools have more school burnout than girls (Salmela-Aro et al. 2008).

Burnout Theories

The adventure of the concept of burnout, which started out with working life in the beginning, has been extended to studies with university students and then studies conducted to secondary and high school students. In this process, the theories that explained the burnout of working in the beginning then clarified the concept of school burnout. These theories are Conservation of Resources Theory, Demands-Resources Model, Social Cognitive Theory, Existential Perspective and Developmental Process Model.

Conservation of Resources CoR Theory

The theory of conservation of resources initially introduced some explanations regarding stress and therefore it is among the theories explaining stress. According to this theory, people want to acquire resources and maintain these resources. Stress is a reaction shown to the loss of a possible resource in the environment, especially the loss that may happen in the resources of the person. These resources include objects, conditions, personal characteristics and energies (Grandey and Cropanzano 1999).

Under which conditions stress emerges is one of the topics that the theory explains. According to the theory, people have a basic motivation to acquire, maintain and protect what they value. These things can be expressed as resources. The theory of the conservation of resources mentions the existence of four main resource categories. These resources are can be listed as (i) objects (such as house, car), (ii) conditions (such as good marriage, regular job), (iii) personal qualities (social self-confidence, high self-

esteem) and (iv) energy (loans, money, and supports). According to the theory, psychological stress or tension in people emerges when; (i) the resources are threatened, (ii) the resources are lost and (iii) the owned resources are lost and failure occurs in the acquisition of the new resources (Hobfoll 1989). In this context, burnout is likely to occur when resources are threatened, lost, or a problem is encountered in acquiring new resources.

This theory also explains the intraroles or interroles results of stress. For example, one's role conflict in business life causes him or her to believe he or she cannot succeed at work. Consequently, this person faces the fear of losing his or her job and transfers the other resources he or she has in order to cope with this fear. According to this theory, the conflicts between the roles also lead to the stress. It is because the working life and the roles in the family are not easy to manage together. This situation or potential for losing resources lead to a negative psychological consequence. Consequently, they experience problems such as dissatisfaction, depression, anxiety, or psychological problems. Planning such as leaving the position at the workplace requires relocation or protection of resources. In case it is not done, this situation may result in burnout (Wright and Cropanzano 1998, Hobfoll and Shirom 2001).

This theory also indicates that besides the risk of losing resources, critical life events can also cause stress. In particular, an event that results in the loss of one of the resources predict the emergence of stress and difficulties in people. According to Hobfoll (1989), the changes do not lead to stress in people on their own. However, a change that results in loss of one of the valuable resources is likely to lead to a problematic situation. Based on this, it can be said that the theory of conservation of resources is a theory that also examines the effect of life changes on the stress level.

When the conservation theory of resources is compared with the gains, it states that people are more affected by losses. Even if the resources are sufficient, the loss of resources has effect at a certain rate. In other words, the loss of resources makes people more vulnerable to possible future resource losses (Vaux and Harrison, 1985).

In theory, it is stated that social support is a great resource potential for the individuals who have this directly. Social support has the feature of meta construct which includes the person's connections with people next to him or her, people who can provide help that may be meaningful to the person and a sincere attitude presented with a supportive intent (Vaux and Harrison 1985, Hobfoll and Stokes 1988). Social support means a feeling of being connected with others or access to persons who may be a resource of assistance in necessary conditions. Social support can result in access to an object, condition, personal characteristic, or energy resources. For example, the people with more social support resources can find someone they can borrow from to have something they want, they can find help to succeed when they encounter a new situation or this support they get from their environment may support their self-esteem. The concept of social support in the conservation theory of resources is approached as an important resource (Hobfoll and Shirom 2001).

In the literature, there are empirical studies supporting the explanations of the conservation of resources theory. The one-dimensional approach of the theory to burnout is supported by many longitudinal studies. According to this, burnout occurs due to the chronic stress exposure that arises as a result of work in the working life of individuals (Hobfoll and Shirom 2001). In a meta-analysis study conducted by Lee and Asforth

(1996), the relationship of demand and resources with the three dimensions of burnout has been examined. It has been seen that in accordance with the opinions contained in the conservation theory of resources there are strong relationships between demands & resources and emotional exhaustion compared to depersonalization and lack of personal accomplishment. Again in the same study emotional exhaustion was found to present a stronger relationship with the resources than the demands. It can be interpreted that people are more sensitive to resource loss.

Compared to the burnout individuals, those dedicated to their works are creating more resources in their working life and daily life, they invest more in social support resources and thus increase their positive emotions. This resource abundance serves as the resource for the development of effective coping with problems in people. The concept of engagement is a satisfaction state defined by dedication and vigor in working life. Vigor is explained as an abundance of energy such as mental indomitableness and persistence despite difficulties (insistence) (Schaufeli et al. 2002, Schaufeli and Bakker 2004). Also, vigor is a positive emotional state that creates resources and spreads them between thought and action. Created and disseminated actions also facilitate the state of being dedicated (Schuafeli et al. 2002). Dedication is another part of the commitment. This is exemplified by the feeling of being important, willingness, striving, praising oneself, and passion (Schaufeli et al. 2002). Resources help to develop being dedicated. This is because dedicated individuals have enough resources to complete their tasks.

Along with the conservation of resources theory, which explains stress and burnout in the workplace, there are also studies in which this theory is adapted to school burnout. Regarding this, it is stated that the students who are studying in the health field leave their education after the high school due to school burnout (Deary et al. 2003). In terms of the conservation of resources, school engagement is considered as a protective factor for the risk of dropout from school (Salanova, et al. 2010). By definition, the phenomenon of school burnout can be explained by these two main concepts as social support and the burden of the responsibilities caused by studies at school. In other words, responsibilities in school refer to the risks of acquiring and losing resources while social support refers to protecting resources (Yang, 2004).

There are many studies available in the literature made for employee burnout on the basis of conservation theory of resources. However, a limited number of studies have been conducted on school and student burnout. One of these is the research conducted on 454 university students by Alarcon et al. (2011). In this study, the case of school burnout has been studied and reviewed in terms of conservation of resources. In the study, social support, coping and consciousness personality trait in the big five-personality theory have been taken as resources. Relationships between these resources, school demands, and school burnout were studied with structural equation modeling. There was no direct relationship between social support and the demands in the study, however, it has been seen that there is a direct relationship between social support and problem-focused coping. In the relationship between school burnout and engagement, it is seen that the coping is partly mediating variable. Along with that, it has been seen that there are significant relationships between demands and school burnout and the personality trait of consciousness is associated with the school burnout through demands. It has been seen that there is a high relation in a negative direction between

school burnout and being dedicated.

Demands-Resources Model

Demand-resources model initially introduced some explanations for stress. However, it later turned to explaining the causes of more burnout. In this context, firstly the demands on the employees at the workplace and then the effects of available resources on burnout and engagement to cope with these demands were studied. The model draws attention to the fact that each profession has its own characteristics in relation to burnout and rather it suggests that these characteristics can be addressed in two general categories as demands and resources (Bakker et al. 2004).

Demands express the needs of the work in terms of physical, social and organizational aspects. There is a psychological cost (such as burnout) of these requirements because they require a constant effort and creates a pressure on the person (Wei et al. 2015). According to Hockey's (1993) demand-control model, people use a performance protective strategy against the environmental stress resources (such as noise, temperature, workload and time pressure). These resources of stress correspond to works demands in the model of demands-resources. Performance protection is accomplished successfully by activation of the sympathetic system (such as autonomic and endocrine systems), an increase of personal effort (active control in the information processing process) or both of them (Hockey 1993). The more people move, or the more effort they make, the more physiological costs they bear. If a person performs such a high-cost behavior for a long time, he or she runs out of energy and gets emotionally exhausted (Demerouti et al. 2001).

Although theories explaining the development of burnout explain the relationship between burnout and job demands, the relations between resources and breaking away from work are explained by the theories about the development and continuity of health (Antonovsky 1987). The basic question of these theories is to determine the factors that protect people's health under the work overload. The answer to this problem is the "resources" that are called health protective factors. Work resources are the physical, psychological, social and organizational aspects of work listed as (i) ability to fulfill the purposes of the job functionally, (ii) reducing the demands of work that leads to physiological and psychological costs and (iii) promoting personal growth and development (Demerouti et al. 2001).

The demands-resources model states that environmental properties can be addressed in two categories as requests and resources. Demands are workload, time pressure, relations with clients, physical environment, and shift work. The resources are feedback, awards, job control, participation, job security and principal support. Excess demands can lead to burnout in people, and lack of resources can lead to breaking away from the work. When the exact opposite is considered, in cases where there is less demand and the resources are sufficient, work engagement and job satisfaction increase in people (Demerouti et al. 2001). Studies in the literature support the model by showing the positive effect of the resources at work on the demands that cause work commitment, performance, and burnout (Bakker and Demerouti 2007, 2008). Personal resources, such as self-efficacy, are also referred to as person-environment interaction and this concept has been included in the model in recent researches. In this context, the studies conducted explain that the resources at work are transformed into work

commitment with personal resources such as self-efficacy (Xanthopoulou et al. 2009).

It is explained by this model that social support affects depersonalization from the dimensions of burnout. Lack of social support, especially in the workplace (Leiter and Maslach 1988, Leiter 1991), restriction of the use of skills (Leiter 1990), low level job control (De Jonge and Schaufeli 1998, De Rijk et al. 1998) and low level of feedback on performance (Maslach and Jackson 1986) are reasons leading to depersonalization. In particular, attention is paid to the importance of social support in the model. It is stated that received social support and feedback are important variables in reducing the negative effect of demands and stress (Cohen and Wills 1985, Bakker et al. 2004).

In summary, this model explains that burnout develops in a two-stage process. In the first stage, job demands create an excessive burden on people and this leads to emotional exhaustion. Inadequate resources in the second stage or resource inefficacy make people confront with job demands and this leads to a complex situation. Then people show withdrawal behaviors. The long-term consequence of withdrawal behavior results in disengagement. Therefore, this model especially argues that the interaction between job demands and internal resources have an effect on the burnout (Demerouti et al. 2001).

It is emphasized that there is a limited knowledge of how to apply theoretical information in the model of demands-resources to the school context in the literature. According to this model, students are faced with too much demand in the academic environment about the lessons and studies that will affect burnout and engagement to the school in the future (Wei et al. 2015). Such situations affect students' engagements level to the school, their burnout level, and their well-being. For this reason, the importance of study and evaluation of the opinions, which were put forward in the model, also in the context of the school is being mentioned. When this model is adapted to schools, demands are regarded as a situation that has the function of fulfilling the purposes regarding lessons and activities; resources are regarded as a situation with the function of realizing the objectives associated with the study. Additionally, as is in the application of the demand-resource model in the working life, self-efficacy beliefs have also been added to school burnout studies. In the model, it has been proposed that demands lead to school burnout in students but self-efficacy beliefs have an important role in improving students' engagement to the school (Salmela-Aro and Upadyaya 2014).

The researchers who try to study and explain the concept of school and student burnout within the frame of this model have noted that the demands related to the work required from students lead to stress in students. However, they emphasize that self-efficacy should be considered as a source for enabling and sustainability of engagement (Vasalampi et al. 2010). In particular, it is explained that work-related resources are associated with school engagement whereas demand is more often associated with school burnout. Based on this, it is foreseen that extreme demands increase school burnout and personal resources have an influence on being engaged to school. In addition, it is stated that the concepts school engagement and school burnout can be thought of as two opposite concepts (Salmela-Aro and Upadyaya 2014).

The demand-resource model predicts two different processes in burnout and school burnout (Demerouti et al. 2001, Salmela-Aro 2014). One of these is overload and fatigue caused by effort-focused energy process and work demands. This situation can

be defined as “demands”. For example, workload and academic pressure lead to energy depletion and stress in the first stage and then result in burnout. At the end of this process, the person's mental health gets impaired. Another process proposed in the model is a motivational process and "resources" that the student can access resulting in being dedicated to the school. This process ultimately contributes to an increase in life satisfaction of the student. High self-efficacy, social support, support for engagement are listed as examples of resources. In addition to that, demands are work-related difficulties during school years, overwork and prevention of engagement (Salmela-Aro and Upadyaya 2014). While the study-related resources are more decisive in students' developing engagement to school, work-related demands are more evident in the occurrence of school burnout. Study demands are a challenge for study-related purposes. However, resources have an important role in achieving these goals. Consequently, as a result of school burnout, situations such as depression and school dropout are being observed, being dedicated to school improves students' doing well and learning (Salmela-Aro 2017).

In a study by Salmela-Aro and Upadyaya (2014), it has been concluded that year-end study demands presented a positive relationship with school burnout in vocational high school students whereas the study sources are positively related to the engagement to school. In addition, it has been seen in the study that self-efficacy beliefs have a positive correlation with engagement to education and a negative relationship with school burnout. In a study conducted by Salmela-Aro et al. (2008), school burnout has been found to be a strong predictor of depression again in vocational high school students. In addition, the predictive power of school burnout has also been examined and it has also been seen that depression also predicts school burnout. However, it has been seen that school burnout has higher predictive power in depression. In addition, research has reached the conclusion that life satisfaction is a predictor of school engagement. These findings obtained in the research have been interpreted as school burnout has “spillover effect” in other areas of life whereas other areas of life have a positive effect on the school.

In a recent research conducted in the cross-lagged pattern by Salmela-Aro et al. (2017), it has been seen that school burnout predicts internet addiction; it has been seen that in the next stage internet addiction predicts school burnout and in the last stage both school burnout and internet addiction predict depression. This situation is interpreted as internet addiction affects school-related mental health negatively in adolescents and it has a negative effect on the general mental health with the spillover effect in the last stage. In this context, researchers indicate that the demand-resource model is a useful model for explaining students' levels of adjustment to school and general adjustment. Especially in the school context, it is mentioned that burnout has a mediator effect on demands and mental health (Salmela-Aro 2017).

Social Cognitive Theory

Self-efficacy is one of the most central concepts in social cognitive theory (Bandura 1997). Self-efficacy expectation in social cognitive theory is the most basic determinant about what behavior will be the initiator for an action to take place, how much effort will be made and how long it will take if failure or obstruction is encountered (Schwarzer and Hallum 2008). In a more concrete sense, self-efficacy includes the beliefs whet-

her a person can or cannot complete the task in a particular task (Yang 2004). According to the theory, self-efficacy makes a difference in how one thinks, feels, and acts. In terms of feelings, it is stated that low self-efficacy may lead to depression, anxiety, and hopelessness. It is stated that those with low self-efficacy have low self-esteem and they also have a pessimistic view of their success and personal development. A strong sense of competence in terms of thought facilitates performance and cognitive processes in different environments. This situation also determines the quality of decision-making and academic achievement (Schwarzer and Hallum 2008). Also, individuals with low self-efficacy have doubts about their competence in overcoming an uncertain situation and they give up easily (Yang 2004).

The social cognitive theory is one of the widespread theories regarding views on explaining human behavior (Bandura 1977, 1982). In literature, based on the views expressed in social cognitive theory, the case of burnout in the working life has been researched and studies have been made on this subject (Schwarzer and Greenglass 1999). Similarly, the concepts and views expressed by this theory are also used in the case of school burnout. Self-efficacy, one of the most important concepts of the theory, is evaluated as a feature associated with burnout and school burnout (Yang 2004). The self-efficacy beliefs, the demands explaining school burnout are also addressed to in resources model and self-efficacy is considered as a personal resource in dealing with burnout (Xanthopoulou et al. 2009). In addition, it is reported that there is a positive relationship between engagement to the school, which is an exact opposite of school burnout, and self-efficacy (Salmela-Aro and Upadyaya 2014).

More than thirty years, the researchers have been using the concept of self-efficacy to explain the phenomenon of burnout (Yang 2004). In order to explain the concept of self-efficacy, Albert Bandura suggested the views expressed by social cognitive theory. According to Bandura, self-efficacy is the ability of a person to create an action plan in order to be able to perform in a certain matter and to evaluate the skills related to this task. As is known, self-efficacy is a powerful predictor of performance in a given task and is the degree to which one perceives his or her talents in a particular task. Self-efficacy expectation is one of the determinants of what task or activity the person will choose. With a more specific expression, people with higher self-efficacy beliefs tend to more challenging tasks. On the contrary, people with weak self-efficacy beliefs prefer tasks below their talent (Bandura 1977).

Self-efficacy level increases or decreases motivation. Individuals with high self-efficacy prefer challenging task (Bandura 1997). They determine higher goals for themselves and are devoted to these goals. Actions of people are formed by their thoughts and based on this people predict future scenarios that are optimistic or pessimistic about themselves according to their self-efficacy. When a step is to be taken in a matter, those with high self-efficacy are making more efforts in a task compared to those with low self-efficacy and show more persistence. When they meet an obstacle, they are recovering faster and are reconnecting to their purposes. High self-efficacy allow people to choose more challenging tasks at the same time, discover their surroundings and create innovations. Some people have doubts about themselves and cannot motivate themselves. These people have weak faith in themselves to accomplish their goals. In addition, these people do not know what steps to take in order to be successful. In this sense, self-efficacy belief differs in three respects from self-esteem, self-concept, audit focus

and other similar characteristics. (i) self-efficacy is an inner attitude (I am the reason for the behavior I display), (ii) it is a source for future behavior and (iii) the desired behavior is closely related to cognition and is a good predictor of correct behavior. For this reason, self-efficacy has a functioning structure (Schwarzer and Hallum 2008).

High self-efficacy provides comfort to individuals when they are engaged in a difficult task or activity. On the contrary, low self-efficacy causes the task that people are doing to seem harder than it actually is. This leads to a more limited perspective on stress, depression, and problem-solving (Yang 2004). Self-efficacy shows a protective characteristic when it comes to dealing with difficulties. The optimistic view of a person's ability to cope with daily difficulties increases motivation in coping and offers a more structured way. Therefore, those with high levels of self-efficacy are more likely to meet both the demands of their work and the demands of everyday life than those who doubt themselves. Individuals who are well-suited to such demands will be more resistant to burnout (Schwarzer and Greenglass 1999, Caprara et al. 2003, Skaalvik and Skaalvik 2007).

In the most general sense, it is emphasized that self-efficacy influences one's goals, emotional reactions, effort, coping behaviors and persistence in a task (Yang 2004). Researchers have revealed the relationship between some psychological states and burnout. One of these features is self-efficacy. In these studies, it has been stated that individuals who do not have a sense of mastery, in other words, those with low self-efficacy beliefs, experience easier burnout and their adaptation capacities are weaker (Cherniss 1992). Based on these views, it can be said that the higher the level of self-efficacy in people, the lower the rate of burnout. Internal variables such as self-efficacy level are associated with burnout in almost all occupations (Maslach and Jackson 1985).

The social cognitive theory states that self-efficacy, as well as burnout, affects students' perceptions of performance on a specific task. Based on this theory, social support and the workload of lessons are two important factors affecting burnout (Yang 2004). The studies in the literature reveal the relationship between self-efficacy belief and getting high grades from lessons in high school (Caprara et al. 2010). For this reason, it is stated that self-efficacy can contribute positively to students' ability to cope with stress. In addition, it has been reported that the solution-focused therapy approach in adolescents is effective in increasing self-efficacy. Especially in terms of dealing with school burnout, it is recommended to carry out studies enhancing self-efficacy and solution-focused coping and the attention should be drawn to the relationship between self-efficacy and school burnout (Walburg 2014).

Existential Perspective

Burnout is treated as a type of stress or as a result of stress when the concept was first introduced. However, Pines (2000) suggests that there is a large number of anecdotal evidence that burnout is not a result of high level of stress. He states that from time to time stress in the workplace reflects the importance of the work that one is doing and may, therefore, be associated with a low level of burnout. In this regard, he cites a health worker's following statement: "On my busiest days, I enjoy work more than other days. Burnout occurs when I cannot help a patient." Based on this, he states that burnout may be a subspecies of stress and there may be different variables in terms of increasing burnout, being associated with burnout and the results it will cause. Along

with that, more emphasis on the organizational factors in relation to burnout in the studies dealing with teacher burnout especially in the field of education constitutes an opinion that burnout is affected by organizational variables according to the individual variables (Pines and Aronson 1988, Maslach and Leiter 1997). However, it is stated that the best predictors of burnout are not organizational variables but rather individual variables (Kremer-Hayon and Kurtz 1985).

From an existential point of view, the real reason for your burnout is that people do not find their lives and jobs meaningful and functional (Clarkson 1992, Pines 1993, Yiu-kee and Tang 1995, Manzano-Garcia and Ayala-Calvo 2013). Similarly, burnout directly affects people's values and hopes. This causes people to question both their profession and their existence (Maslach and Leiter 1997). According to Frankl (2013), the search for meaning in human life is the primary instinct in life. In addition, when people find the work they do meaningful, this offers a way to deal with the fear of confronting death. A person, who expects to get the feeling of importance from his or her work from an existential point of view, starts out with high goals and expectations; he or she becomes an idealist and more motivated about work. However, if the person feels that he or she is unsuccessful, then the job becomes unimportant. The person starts to feel that he or she will not be able to make a difference in the world, starts to experience hopelessness and despair and finally the feeling of burnout (Pines and Keinan, 2005). There are studies revealing this situation. In his study, Pines (2000, 2002) has revealed that there is a negative relation between feeling important and burnout. Although the correlational studies have not revealed any information regarding the causality among variables, one of the possible consequences of the burnout is finding work is insignificant. In addition, it can be argued that burnout and feeling of insignificance are the results of a more general stress factor (Pines and Keinan 2005).

The existentialist viewpoint states that teacher burnout is related to high-level needs including the need to achieve and devoting all the potential to the job and a sense of self-fulfillment (Malanowski and Wood 1984). Dealing with problematic behaviors of students too much, decrease in students' learning and lack of student participation in lessons in schools cause the teachers to feel the sense of worthlessness. This leads to teacher burnout in the last stage (Pines 2002).

From the existentialist point of view summarized above, the phenomenon of burnout is more often observed as a result of the loss of meaning in life. Besides that when a person finds the job he or she does worthless, meaningless, and thinks that he or she does not make a difference in the world he or she experiences the feeling of burnout. Based on this, school and student burnout concept can be considered as a situation associated with meaning in life and whether the activities carried out at school are deemed valuable by the student.

Developmental Process Model

According to Nurmi (2012), modeling in psychology is how the facts and theoretical concepts on the basis of work or their direct and indirect relations with each other are observed and how they can be generalized. It is stated that these interactive processes consist of three levels and each level consists of two sub-levels within itself: Theory building (meta-theories and theories), modeling (models and measurement models) and measurability (variables and phenomena).

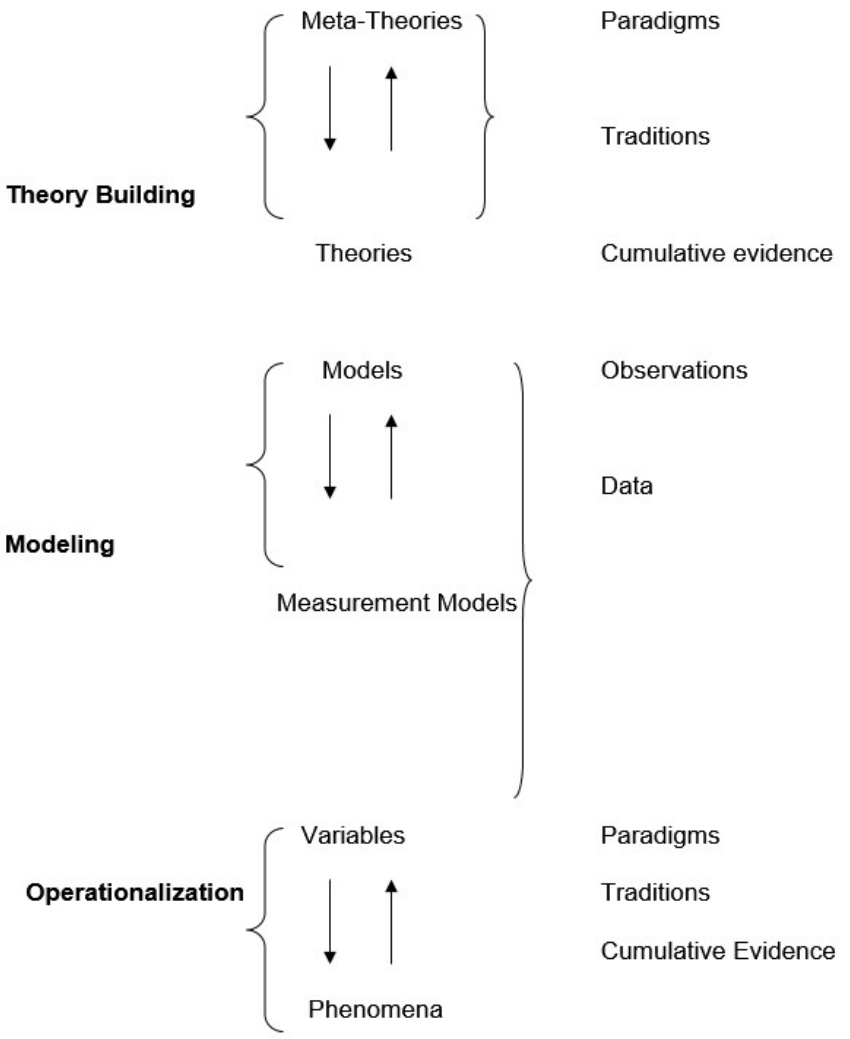


Figure 1. Interaction between different levels of modeling (Nurmi 2013)

As is also shown in Figure 1, first of all, meta-theories are made of at the most general and concrete level (such as learning theories or psychoanalysis), and general principles of specific research areas. However, these theories influence the construction of more specific theories that cannot be misunderstood by individual studies or experiments. In the next stage, theories come to a more concrete and more articulated level (For example, learned helplessness theory). However, these theories, as in meta-theories, can rarely be falsified by only one study. One of the key thoughts presented in Figure 1 is the different levels of theoretical conceptualizations interact with each other.

In the long run, the development of new theories and the change of paradigms in a particular research area can affect meta-theories. Similarly, theories often derive from some key principles of meta-theories (Nurmi 2013).

It is defined as second level modeling in the modeling process. At this level, there are two sub-levels. One of these is the "models" typically detailed, concrete, testable, and empirical and derived from other theories that can be falsified. The other sub-level of the modeling is the testing of the measurement models. Theories typically include some key structures and these structures provide the basis for creating measurement models. Testing of measurement models includes whether certain theoretical constructs will be tested in valid and reliable ways (Nurmi 2013).

The third part of modeling is to "operationalization" key structures to create measuring models based on variables. There are some typical assumptions about how to measure phenomena and key variables in interest areas of different theories in an appropriate way. Variables are various observations of the subject concerned (Nurmi 2013).

Each level of modeling serves different functions of science. Meta-theories typically provide a means for understanding the overall research area. For example, the principles of learning theory, as well as the understanding of learning, are used in many areas of psychology from child development to the development of psychiatric disorders. Theories are typically used as a tool for understanding observations in studies and direct empirical studies. When theories are not useful, the development of new theories is also restricted. Thus, models are used to test broader theories by making use of data obtained from concrete studies. Models may be falsified and if the models are derived from false theories, they lead to the reformulation of these theories. The key role of making it measurable is to ensure that observations are valid and reliable by testing variables and measurement models (Nurmi 2012).

The studies conducted on burnout in working life has contributed to the progression of theories that studied burnout. The first studies based on this theoretical view were conducted by Maslach et al. (2001). However, such studies are mostly cross-sectional studies. In literature, especially cross-sectional research designs are insufficient to explain the developmental processes of psychological features In this context, cross-sectional studies are limited in explaining the causal relationship between burnout and related factors. Therefore, it is suggested that longitudinal studies to explain the developmental processes of various psychological traits are conducted (Tang et al. 2016). As stated in the modeling process, it may be easier to understand what kind of process school burnout is following in developmental sense through studies conducted in the longitudinal pattern by making use of structural equation modeling.

Similar to the burnout phenomenon in working life, school burnout was studied as a one-dimensional structure in the beginning. However, later just like the views on the burnout concept of Maslach, Schaufeli and Leiter, emotional exhaustion, depersonalization and lack of personal accomplishment have been studied as a three-dimensional structure (2001) (Salmela-Aro et al. 2009). Although this situation provides an advantage in explaining and explaining the well-being of students, it is stated that the causality relations between dimensions are not revealed. It is emphasized that revealing the causality between dimensions is beneficial in terms of developmental processes (Parker and Salmela-Aro 2011).

There are studies aiming to reveal the developmental direction of burnout in the li-

terature. In a study conducted by Golembiewski (1989), it has been seen that burnout predicts well-being and success by presenting a model in this direction (Schaufeli and Enzmann 1998). In this model, it has been suggested that burnout occurs gradually, ends in eight separate clusters and is a progressive situation that disturbs harmony (Golembiewski et al. 1983, Golembiewski et al. 1993). According to this progressive model in the first stage, depersonalization develops and this is followed by feelings of lack of personal accomplishment and emotional exhaustion (Golembiewski 1989, Taris et al. 2005).

In the model suggested by Leiter (1989, Leiter and Maslach 1998), more research findings were presented compared to the model proposed by Golembiewski (Lee and Ashforth 1993, Schaufeli and Enzmann 1998, Taris et al. 2005). This model emphasizes that emotional exhaustion is the first component of burnout, that depersonalization develops as an ineffective coping method and then the feeling of lack of personal accomplishment is formed (Leiter 1989). Especially studies carried out in working life generally support the relation between emotional exhaustion and depersonalization. However, the lack of sufficient studies explaining the relationship between feelings of depersonalization and personal accomplishment led to the emergence of alternative models for testing this distinction (Maslach et al. 2001). In this context, Lee and Asforth (1993) supported the model of burnout, which Leiter had presented (that emotional exhaustion predicts both depersonalization and lack of personal accomplishment), with longitudinal research. Finally, the most widespread research in the context of developmental models has been carried out by Taris et al. (2005). In this research, the models presented by Lee and Asforth (1993) and Leiter (1989) were combined. Consequently, it was seen that emotional exhaustion predicted the feeling of personal accomplishment directly and indirectly through depersonalization (Taris et al. 2005).

There are studies aiming to reveal developmental process model in employee burnout as well as studies based on the developmental process model of school burnout. In this direction, aimed at explaining how school burnout develops in students and the course it follows longitudinal researches are being conducted and the results obtained from these studies are discussed in the literature. Parker and Salmela-Aro (2011) collected data for four times with an interval of nine months from 852 high school students, whose age average was 16, in Finland. In this study, in which longitudinal pattern was used, longitudinal panel models were used in the analysis of the data. In the study, it has been seen that exhaustion causes feelings of cynicism and sense of inadequacy. In a similar study conducted by Noh et al. (2013) in Korea, the study started with 405 participants who still continued high school and whose age average was 13. This was three-stage study and analyzes were performed with data from 358 students that participated in all three stages and received $ 5 for each survey participated. It was also seen in this research that emotional exhaustion predicted cynicism and academic inadequacy.

The transition between early and late adolescence periods exists in various cultures and contexts. In this period, due to adolescence period, changes are observed in persons' cognitive development, school transitions, peer and family roles. These changes often occur in adolescents' development trajectories. While the changes that take place during this period express the development and adaptation for some adolescents, for others they may have the feature that distorts adaptation (Gutman and Eccles 2007). Accor-

ding to Stage-environment fit (perspective), it is stated that an adolescent, whose environment changes in a regressive way from developmental sense, may encounter with more difficulties. On the other hand, it is stated that in case the social environment meets the developmental needs of the adolescent, more positive results will be observed in adolescents. This situation is also called stage-environment compatibility of person. This perspective on the general level emphasizes the compatibility of the needs of adolescents moving up to high school from secondary school with the facilities and opportunities that a traditional high school environment provides. In this sense, a low adjustment leads to a decrease in the motivation of the adolescents in transition from secondary school to high school (Eccles et al. 1993).

In addition to examining the causal relationship between the dimensions of school burnout, developmental changes in school burnout and what kind of change school burnout exhibits in educational transitions have been studied. For example, it is stated that there is a decline in the emotional engagement of adolescents, who continue high school in Finland, to school during the period from the 9th grade until the 11th grade (Wang et al. 2015). On the other hand, it is stated that school burnout decreases in the students who make a transition to vocational high schools (Salmela-Aro and Tynkkynen 2012). This situation is linked to the fact that Finnish general high school students feel more exhausted and worried during the time they spend at school because they find less pleasant and valuable. Consequently, the rate of dropout in high school students experiencing school burnout is four times higher than the other students (Bask and Salmela-Aro 2013). At this stage, the importance of the attitude of cynicism towards school is mentioned. This leads to cynicism attitudes towards the society and institutions as well as leading to a reduction in the meaning that a person attaches to school in general (Salmela-Aro 2017).

Conclusion

The Conservation of Resources (CoR) Theory emphasizes that social support protects the individual from stress and burnout especially when the demands are intense. In particular, the abundance of social support resources presents more appropriate ways of coping with stressful situations and burnout. In addition to this, it is also stated that social support has a role not only in providing an emotional catharsis but also in suggesting alternative ways in stressful situations. Among the resources, social support is listed as well as a personality trait of consciousness. It is stated that highly consciousness persons adopt a problem-focused coping strategy rather than an emotion-focused coping strategy in stressful situations or with school burnout and that they cope more effectively with stressful situations. It is stated that this situation is similar with the explanations emphasized in the Demands-Resources Model. It is because those who prefer emotion-focused coping more than problem-focused coping perceive the demands of school or work more intensely (Alarcon et al. 2011). One of the similarities between the two theories is the emphasis on the importance of claims in intensely stressful situations. In other words, in stressful situations, if the resources are limited, the demands seem more for the person (Hobfoll 1989). Based on these explanations, both in the Conservation of Resources as well as in the Demands-Resources Model, it can be said that social support resources are seen to be important in dealing with stressful situations. In addition, both theories draw attention to the fact that it leads to bur-

nout or stress if the demands of the job or school are more than the resources of the individual.

When explanations of Social Cognitive Theory about school burnout is considered, it can be said that the theory emphasizes the concept of self-efficacy, which is a more internal resource. The belief that a person has about completing or overcoming a task reflects the content of the self-efficacy concept (Yang 2004). The emphasis on this inner feature in Social Cognitive Theory exists likewise in the Demands-Resources Model. In this respect, there is an overlapping quality of the two theories. In the Demands-Resources Model, it is stated that personality traits facilitate problem-solving and that problem solving also has a role in coping with school burnout (Alarcon et al. 2011). When self-efficacy beliefs are considered as a feature that contributes positively to the problem-solving processes of the people, it is possible to say that these two concepts are related to school burnout. Based on this, it can be said that there are common characteristics between the Demand-Resource Model and the Social Cognitive Theory.

In terms of the emphasis on understanding meaning in life, it can be said that Existentialist Perspective differs from the Conservation of Resources Theory and the Demand-Resources Model. Not finding the work doe meaningful, not finding school and school activities meaningful is important in terms of school burnout. Unlike other theories, it can be said that this theory gives more weight to the explanations at the individual level of school burnout. Especially when Frankl's (2013) views on happiness in the sense of life are taken into consideration, it can be said that a student's finding school activities, lessons and the school itself meaningful is related with a low level of school burnout (Pines and Keinan 2005). Based on this, it can be said that descriptions of Existential Perspective regarding school burnout are based on a philosophical basis and mostly at the individual level. However, on the basis of this theory, it is seen that the number of studies on school burnout is relatively limited in the literature. For this reason, it can be said that there is a need for empirical studies based on existentialist theory.

Developmental Process Model, one of the theories and models covered in the study, provides important information about especially the developmental processes of burnout. This approach attaches importance to modeling studies in school burnout (Nurmi 2012, 2013). On the basis of this model, it is observed that longitudinal studies on school burnout have begun to be made in recent years. Unlike other theories and approaches, this type of longitudinal studies intends to reveal the trajectories of burnout follows according to developmental processes, and the causes of it.

Recently, the concept of burnout has begun to be dealt with in the field of sports as well as in work and school life. This concept is expressed as sports burnout (Sorkkila et al. 2017a; Sorkkila et al. 2017b). Measuring tools have also begun to be developed in this regard (Sorkkila et al. 2017b). In addition, emotion regulation (Seibert et al. 2017) and the relationship between intimate partner violence and school burnout is examined empirically (Cooper et al. 2017). In the field of health, it is possible to see studies that study the connection between school burnout and cardiovascular disorders (May et al. 2018).

As can be understood from the theoretical framework in this study, the concept of burnout negatively affects the adjustment of both employees and students in their daily lives, mental health, and general well-being. Although, in particular, studies dealing

with employee burnout are frequently seen, it can be said that school burnout studies are relatively limited. Although especially in the recent times, studies have been carried out on the basis of the Demands-Resources Model and the Conservation of Resources Theory, the increase in the number of studies based on other theories will make it easier to meet the important needs in the relevant field.

When compared to other theories and interventions, the relatively new Developmental Process Model mostly concentrates on longitudinal research. Longitudinal research provides a rich information about the development and change of a feature over time. For this reason, it brings along a long-term data collection process. Although it is obvious that it is difficult to carry out studies like this, considering the findings it provides, the importance of longitudinal studies draw attention. However, the longitudinal studies on both the employee burnout schools in Turkey have not been found. In the context of a developmental process, in order to understand the course that school burnout follows, longitudinal studies are needed.

Although the concept of school burnout with different variables is studied in Turkey, studies on prevention of school burnout or intervention in school burnout are limited. It is clear that especially for secondary school and high school level intervention-based studies including adolescents are needed. For preventive and protective mental health, it is important that such studies become widespread.

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Chapter 6

Self-regulation

CHAPTER 06
SELF-REGULATION OF BEHAVIOR

Chances are you know people who work really hard at what they do. They always try their best and rarely give up. When the going gets tough, these people get going. You probably also know people who aren't like that at all. They're content to settle for "second best" or are easily frustrated when encountering difficulties.

In this chapter we will apply principles from the field of motivation to examine differences of this sort. Motivational psychologists are concerned with why people (and animals) behave as they do. Why do people choose to do one activity and not another? Why does one person persist in the face of difficulties, while another person withdraws and quits? These are the sorts of questions motivational psychologists pose.

We will begin by outlining a general model of motivated behavior. This model (referred to as a model of self-regulation) assumes that behavior is goal directed or purposive. This means that people select a goal from among various alternatives and then set about trying to reach their goal. Clearly, not all behavior is of this type. Often, people act out of habit, reflex, or impulse. This type of nonpurposive behavior is not covered in the analysis that follows.

Next, we will focus on how self-relevant processes affect goal-directed behavior. Numerous factors influence what people choose to do in life and whether or not they meet their goals. In the second section of this chapter, we will see that people's thoughts and feelings about themselves are among the most important of these factors.

The third section of this chapter will focus on behavior in achievement situations. Here we will examine how self-relevant thoughts and feelings influence persistence and performance in classroom settings.

Finally, we will consider situations in which people fail to effectively regulate their actions. Our concern here will be with understanding how people's self-relevant thoughts and feelings can contribute to negative behaviors, such as alcoholism, aggression, and suicide.

I. A General Model of Self-Regulation

A. *Three Component Processes*

Self-regulation models are concerned with what individuals choose to do and how they go about trying to accomplish their goals. In more formal terms, we can distinguish three components of the self-regulation process: (1) goal selection, (2) preparation for action, and (3) a cybernetic cycle of behavior (made up of several component processes) (Markus & Wurf, 1987).

1. *Goal Selection*

The first stage in the self-regulation process is the goal-selection stage. Before they can effectively regulate their behavior, people must select a goal; they must decide what they intend to do.

Many motivational theorists assume that goals arise in the context of an expectancy-

value framework (Atkinson, 1964; Rotter, 1954). Expectancy-value models assume that people select goals according to their expectancy of reaching the goal, in conjunction with the positive value they place on attaining the goal and the negative value they place on not attaining the goal. The idea here is really quite simple. If, for example, we want to predict whether a person will adopt getting a Ph.D. in psychology as a goal, we would want to know how likely the person thought it was that she would successfully complete the Ph.D. requirements and the value she places on receiving versus not receiving a Ph.D.

In an expectancy-value model, these factors are assumed to combine in a multiplicative fashion. This means that we multiply (rather than add) the two factors together to determine the strength of an individual's motivation to engage in some behavior. This assumption has an interesting and important consequence. It means that if either value is set at zero, the goal will not be adopted. If a person sees no possibility that she can successfully complete a Ph.D. program (i.e., if expectancy = 0), she will not apply to graduate school, no matter how much she might value getting a degree. Conversely, if she places absolutely no value on getting the degree (i.e., if value = 0), she will not apply to graduate school no matter how probable she thinks success would be.

Goals can be conceived at different levels of abstraction (Powers, 1973; Vallacher & Wegner, 1987). Some of these interpretations are specific and concrete; others are broad and abstract. For example, reading this passage may be relevant to several of your goals, such as "learning the material," "doing well on a test," or "preparing for graduate school." Generally speaking, goals conceived in broad terms assume greater value than do goals conceived in specific terms (Vallacher & Wegner, 1987).

At the most general level, people's goals center around who they want to be or what they want to become. For example, a person might be striving to "be independent" or even to "be a good person." Self-relevant goals like these have been studied by numerous researchers (e.g., Emmons, 1986; Klinger, 1977; Little, 1981; Zirkel & Cantor, 1990) and are often the most highly valued goals in life.

2. *Preparation for Action*

Having adopted a goal, people prepare to attain it. This is the second stage in the self-regulation process. Here, people gather information, construct scenarios regarding possible outcomes, and engage in behavioral practice (rehearsal). In short, they design and prepare to implement a plan to achieve their goal. Of course, not all behavior fits this model. As noted earlier, sometimes people act impulsively without a good deal of forethought. Impulsive behavior of this type is not considered in this framework.

3. *Cybernetic Cycle of Behavior*

The third stage in the self-regulation process has been conceptualized as a cybernetic cycle of action. Cybernetics is the study of how entities use information to regulate their actions (Wiener, 1948). It is also called control theory, as it emphasizes negative feedback control as the means by which machines (e.g., thermostats, guided missiles, cruise control settings in automobiles) as well as animals adjust their behavior to match some standard. In this context, negative feedback doesn't mean bad or unfavorable; it means discrepancy reducing.

A prototypic example from the field of engineering would be a thermostat and furnace. A thermostat is equipped to sense the temperature in a room. The room temperature is then compared against a desired value. If the present temperature in the room is below the desired value, the thermostat ignites the furnace, the heat comes on, and the discrepancy is reduced. When the standard is met, the furnace turns off.

Formally, this process is known by the acronym TOTE, as it involves four stages: (1) a test phase, in which a present value is compared against some relevant standard (the current temperature in the room is compared with the desired temperature); (2) an operate stage, in which an action is undertaken to bring the present value in line with the standard (the heat comes on if the room temperature is below the standard); (3) another test phase, in which the new value is compared with the standard (the new room temperature is compared with the desired temperature); and (4) an exit, or quit, stage, which occurs when the desired goal is reached (the furnace shuts off when the room reaches the selected temperature).

Table 6.1 describes this process, extending it to better capture the complexities of human behavior. The sequence begins after a person has selected a goal and has prepared to attain it. For purposes of illustration, imagine that someone has adopted the goal of running a mile in a specified time. After spending some time training (preparing), the person heads for the track. There, the person (1) runs a mile, (2) observes his behavior (times himself), and (3) compares his time against the adopted goal.

Table 6.1. The Processes That Make Up the Cybernetic Cycle of Behavior

1. Initial behavior (Run a mile)
2. Observe behavior (Time oneself)
3. Compare against some standard (Compare time against goal)
4. Expectancy (Form an expectancy that future behavior will reduce the discrepancy between present behavior and the standard)
5. Emotional reaction (React emotionally to discrepancy between performance and goal)
6. Behavioral adjustment (Continue striving toward goal or quit)

Note: In this example, a person has set a goal of running a mile in a specified time. The table describes the various stages that occur once the person has prepared to reach the goal..

Thus far, the sequence is no different than what was described with the thermostat. The complexities of human behavior enter into the analysis in the next two steps, labeled expectancy and emotional reaction in Table 6.1. Assume that the person has fallen short of his goal (i.e., his time was slower than his specified goal). The person then forms an expectancy about the likelihood that the discrepancy can be reduced. We will treat this expectancy as a binary, either-or decision; that is, the person has either a favorable or unfavorable expectation of being able to close the gap (Carver & Scheier, 1981).

At the same time the person is forming a cognitive expectancy, he will experience an emotional reaction to his performance. These emotional reactions can take many forms, ranging from positive emotions of pride and self-satisfaction to negative emotions of

disappointment and despair. Finally, based on the expectancies he has formed and the emotion he is experiencing, the person will readjust his behavior. If his expectancies of success are high and his emotional reaction is positive, he will probably continue working toward his goal, perhaps fine-tuning his training regimen. If his expectancies of success are low and his emotional reaction is largely negative, he may give up the goal altogether (and take up painting!).

B. *Three Self-Relevant Phenomena*

To this point we have looked only at a generic model of the self-regulation process, without considering where and how self-relevant processes come into play. We will explore this issue by first discussing three self-relevant processes that influence people's efforts to regulate their behavior. After describing these processes, we will examine their effect on motivated behavior.

1. *Self-Efficacy Beliefs*

People's beliefs about their ability to succeed exert a strong influence on the self-regulation process. Bandura (1986, 1989) refers to such beliefs as self-efficacy beliefs. People with high self-efficacy beliefs think they have the ability to succeed at a task, to overcome obstacles, and to reach their goals. People with low self-efficacy beliefs doubt their ability to succeed and do not believe they have what it takes to reach their goals. Importantly, these beliefs are only partly based on people's actual abilities. In any given domain, people with high self-efficacy beliefs are not necessarily more able than are those with low self-efficacy beliefs.

The classic tale of *The Little Engine That Could* illustrates these differences. The little blue engine that ultimately carried the toys over the mountain to the waiting children had high self-efficacy beliefs ("I think I can; I think I can"). Many of the other trains doubted their ability to make the trek over the mountain; they would be classified as having low self-efficacy beliefs. As we shall see momentarily, people's beliefs about their capabilities exert an important influence at virtually all stages of the self-regulation process.

2. *Possible Selves*

People's ideas about what they may be like in the future also influence motivated behavior. Markus and her colleagues (Markus & Nurius, 1986; Markus & Ruvolo, 1989) coined the term possible selves to refer to these beliefs. To illustrate, an aspiring gymnast might have a clearly articulated "Me winning an Olympic gold medal" possible self. This person is able to vividly imagine herself on the victory stand with the national anthem playing in the background and the crowd cheering while she receives her medal.

Tara Lipinski, an American figure skater, exemplifies this phenomenon. When she was 6 years old, Lipinski watched the 1988 Olympics on television. Mesmerized by the winning gold medalists, she had her father construct a cardboard podium so that she could stand on a pretend victory stand when the athletes received their medals. Less than 10 years later, at age 15, Lipinski became the youngest gold medalist in Olympic history, winning the women's figure skating championship at the Nagano Olympics.

Most of our possible selves are positive (Markus & Nurius, 1986), but people have negative possible selves as well. Typically, these negative possible selves involve fears of

what we may become if we fail to take some course of action. A recovering alcoholic, for example, may have a clear image of what he will be like if he returns to drinking. These negative possible selves can also serve a motivational function, to the extent that people are motivated to avoid them (Oyserman & Markus, 1990).

3. *Self-Awareness*

A third variable of interest to a motivational analysis of behavior is self-awareness. As discussed throughout this text, the self has a reflexive quality: People are capable of taking themselves as the object of their own attention. But our attention is not always focused inward. Much of the time (perhaps most of the time) our attention is focused outward on the environment. This means that attentional focus is variable and that self-awareness is a transient state. Sometimes we are aware of ourselves; other times we are not.

Duval and Wicklund (1972) were among the first theorists to propose that differences in attentional focus have important motivational consequences. They argued that when people focus their attention inward (i.e., when they become self-aware), they tend to compare their present state with a relevant standard. Positive emotion arises when people believe they are meeting or exceeding a relevant standard; negative emotion arises when people believe they are falling short of a relevant standard. Duval and Wicklund further proposed that the negative emotion that arises from a perceived discrepancy is experienced as an aversive state of discomfort that people are motivated to reduce in one of two ways: (1) People can try to reduce the discrepancy by working to bring their behavior in line with the standard, or (2) they can attempt to avoid thinking about the discrepancy by shifting their attention away from themselves and onto the environment.

Let's look at an example. Imagine you are passing by a department store window when you see your reflection in the glass. As you gaze at yourself, you notice that your hair is not as neat as you would like it to be. You then run your fingers through your hair in an attempt to fix it. In the language of the theory, seeing your reflection in the window shifted your attention away from the environment and onto yourself. This attentional shift led you to notice a discrepancy between your present state and some relevant standard. The noticed discrepancy then engendered negative emotion, which you were motivated to reduce by fixing your hair. If, for some reason, you could not fix your hair, the theory would predict that you would try to reduce discomfort by shifting your attention away from your own reflection.

Carver and Scheier (1981) offered an elaboration and modification of these ideas. In agreement with Duval and Wicklund (1972), Carver and Scheier believe that self-awareness leads people to compare their present state with a relevant standard. Carver and Scheier do not, however, believe that the presence of a discrepancy inevitably produces discomfort in people. Instead, they contend that negative feelings arise only if the person believes the discrepancy cannot be reduced. In their model, then, it is not the presence of a discrepancy that determines the person's emotional reaction; rather, it is the person's expectancy about whether or not the discrepancy can be reduced.

Carver and Scheier (1981) also took issue with Duval and Wicklund's claim that behavioral regulation is driven by a desire to reduce an aversive state of discomfort.

Applying the principles of control theory, they argued that information processes, not emotional ones, guide the behavioral regulation process. For these theorists, "information regarding the outcome of one's action and the subsequent guidance it provides are [the basic elements of] self-regulation" (Carver & Scheier, 1982a, p.124). We will examine the importance of these claims in the sections that follow.

II. Putting The Self into Self-Regulation

Having defined three aspects of the self-regulation process (goal selection, preparation for action, and the cybernetic cycle of behavior) and discussed three self-relevant processes (self-efficacy beliefs, possible selves, and self-awareness), we are ready now to put these pieces together and look at how people's thoughts and feelings about themselves influence motivated behavior.

A. *The Self and Goal Selection*

We will begin by looking at what determines the goals people adopt in life. Earlier we noted that goals are adopted according to an expectancy-value framework. When making a choice among various courses of action, people take into account the likelihood that they will reach some goal and the positive value they place on doing so (relative to the negative value they place on failing to reach their goal).

Self-efficacy beliefs are directly relevant to the expectancy component in this model. All else being equal, people select goals they believe they can achieve. Because people with high self-efficacy beliefs assume that they have high ability, they adopt more challenging goals than do people with low self-efficacy beliefs. And because adopting more difficult goals is linked with superior performance (Locke & Latham, 1990), people with high self-efficacy beliefs tend to perform better on tasks than do those who doubt their ability to succeed.

People's ideas about themselves also influence goal selection through the value component in an expectancy-value model. What people value in life is tied to how they think about themselves. The person who thinks of herself as an intellectual values intellectual pursuits; the person who regards herself as an athlete values athletic pursuits. In more general terms, we can say that people value activities that match or reaffirm what they think they are like (Swann, 1990).

Possible selves also influence goal selection. People not only value activities that allow them to reaffirm who they think they are now, they also value activities that allow them to lay claim to possessing future identities. The youngster who clearly imagines himself pitching in the World Series one day values activities related to baseball. When choosing how to spend a Saturday afternoon, it is a pretty good bet this youngster will opt to play ball. This process is a bit different than the one just discussed, because here it is a future identity that the person is wishing to establish, not a present identity he is wishing to affirm.

There is another way in which possible selves influence motivation. This occurs when people tie goal attainment to the establishment of a desired identity. To illustrate, suppose I decide my house needs painting and I connect this goal to a future conception of "Me as handyman." I then set about the task of painting my house. The connection I have forged between the goal and how I think about myself means that having a freshly painted house is no

longer my only goal. Painting the house is also important for what it says about me as a person; completing the goal allows me to lay claim to the desired identity of "handyman." At an even broader level, it might even signify that "I am a competent and responsible person who can accomplish what I set out to do." In this manner, goal attainment implicates how I think and feel about myself. These connections add to the value of the goal, thereby increasing my motivation to succeed.

One way to think about these processes is in terms of the hierarchy of goals we discussed earlier. Painting my house can be conceptualized at many different levels of abstraction. At one level, I could be said to simply be painting the house. At an even lower level, I could be said to be dipping my brush in paint; or lower still, to be tensing my muscles. At higher levels, I could be said to be demonstrating my ability as a handyman, an artisan, or even a competent, worthwhile person. Ordinarily, then, the more general and abstract our conception of an activity becomes, the more relevant self-processes become (Vallacher & Wegner, 1987). By construing goals at very broad levels and tying them to how we think (or wish to think) about ourselves, we increase the value of goal attainment.

B. *The Self and Preparation for Action*

Self-relevant phenomena also influence behavior during the preparation for action state. Recall that during this stage, people gather information, plan and rehearse various courses of action, and engage in behavioral practice. Self-efficacy beliefs have been linked to these processes. People with high self-efficacy beliefs seek more information and spend more time practicing than do those who doubt their ability to succeed (Bandura, 1986, 1989).

At first, these effects may seem paradoxical: Why should those who are highly confident of success spend more time in preparation than those who doubt their ability to succeed? The difficulty and familiarity of the task is relevant to this apparent contradiction. For tasks that are easy, familiar, or well learned, high self-efficacy beliefs do not necessarily lead to greater preparation. But when a task is difficult or is being approached for the first time, people who believe they have what it takes to succeed spend more time and energy preparing to attain their goals than do those who are beset by doubt.

Self-efficacy beliefs and possible selves also influence the mental scenarios people construct prior to engaging in some activity. Often people anticipate what is likely to happen before undertaking a task. For example, athletes are encouraged to develop a clear mental picture of themselves succeeding before participating in an important competition. Self-efficacy beliefs influence these mental pictures. People with high self-efficacy beliefs are more apt to imagine themselves succeeding than are those who doubt their ability to succeed. The same is true for those who have clearly articulated positive possible selves.

Visual images of this sort can influence performance. In general, people who are able to clearly visualize themselves attaining a goal are more likely to reach it than are people who have difficulty forming such a mental image (Feltz & Landers, 1983; Markus, Cross, & Wurf, 1990). A study by Sherman, Skov, Hervitz, and Stock (1981) illustrates this effect. In this study, participants were told that they were about to take an anagram test. Prior to taking the test, one-third of the participants were asked to spend a few minutes imagining they had already taken the test and had done very well. Another one-third of the

participants were asked to spend a few minutes imagining they had already taken the test and had done very poorly. A third group of participants were in a control condition and were given no imagination instructions. Finally, participants rated their performance expectancies and took the anagram test.[1]

Figure 6.1 presents the results from the anagram task. The figure shows that participants who were asked to imagine themselves succeeding at the task solved more problems than did participants in the control condition, and that participants in the control condition solved more problems than did participants who were asked to imagine themselves failing at the task. These findings support the claim that the mental scenarios people construct prior to undertaking a task can influence their level of performance (Campbell & Fairey, 1985).

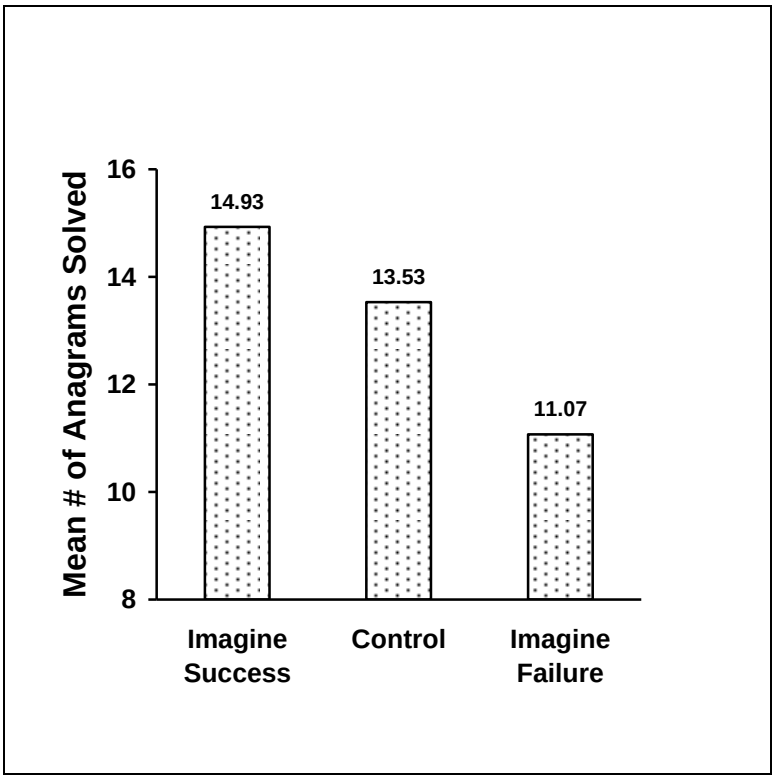

Figure 6.1. Visualization and task performance**. Participants who imagined themselves succeeding solved more problems than did control participants, and control participants solved more problems than did participants who imagined themselves failing. These findings support the claim that mental images of success or failure influence task performance. (Source: Sherman, Skov, Hervitz, & Stock, 1981, *Journal of Experimental Social Psychology*, *17*, 142–158**

C. *The Self and the Cybernetic Cycle of Behavior*

The next stage in the self-regulation process is the cybernetic cycle. Having adopted a goal and formulated a plan of action, individuals set out to achieve it. Generally speaking,

[1] This is only a partial description of the study by Sherman et al. (1981). Additional experimental conditions were included but are not discussed here.

success at any activity depends on four factors: ability, effort, strategy, and luck (Heider, 1958). Whether I win my next tennis match, for example, depends on (1) how skillful I am relative to my opponent's skill; (2) how hard I try; (3) the strategies—both cognitive and behavioral—I use during the match; and (4) luck.

For purposes of our discussion, we will regard ability as a fixed quality—akin to aptitude. As we use the term, then, ability refers to actual underlying capacity. In this sense, it is more a property of personality than of the self. Luck resides outside of the person's influence, so it, too, is not a property of the self. But the other two factors that influence goal attainment, effort and strategy, are strongly influenced by self-relevant thoughts and feelings.

1. *Self and Effort*

As concerns effort expenditure, self-efficacy judgments influence how hard and long people will work at attaining a goal. All else being equal, people work harder and persist longer when they believe they have the wherewithal to succeed than when they have doubts about their abilities (Bandura, 1986). This is particularly true when obstacles to success are encountered, which is the case with almost all important goals in life.

The important role these beliefs play in performance was documented by John White (1982) in his book *Rejection*. White notes that a common characteristic of many eminent scientists, artists, and writers is an unshakable belief in their abilities. These beliefs allowed them to weather rejection and overcome disappointment. Gertrude Stein, for example, submitted poems to editors for over 20 years before finally having one accepted. Similarly, over 20 publishers rejected James Joyce's book, *Dubliners*. A resolute belief in their ability allowed these writers to continue trying, ultimately leading them to succeed.

Possible selves have also been linked to this stage of the motivation process. People who can vividly imagine themselves reaching some goal work harder than do those who lack this capability. This may be particularly true when the positive possible self is accompanied by a negative possible self (Oyserman & Markus, 1990). Imagine, for example, a person who enters medical school with both a clearly articulated positive possible self (myself winning the Nobel prize in medicine) and a clearly articulated negative possible self (myself flunking out and ending up on the streets). The positive self-image provides a powerful incentive to succeed (a carrot) and the negative self-image provides a powerful reason not to fail (a stick). As long as the positive image is more powerful than the negative, the two images working in concert can boost motivation more than either one alone.

2. *Self and Strategy*

Self-processes also influence the strategies people adopt in their pursuit of goals. People who believe they have the ability to succeed adopt more efficient and sophisticated problem-solving strategies than do those who doubt their ability to succeed (Bandura & Wood, 1989). Being high in self-efficacy also reduces anxiety and keeps one's attention focused on the task. This is particularly true when initial difficulties are encountered. Because anxiety itself can be debilitating and impair performance, the link between self-efficacy and anxiety reduction provides another means by which self-efficacy beliefs

promote success.

The ability to stay focused on the task at hand is related to another important factor that affects whether or not people achieve their goals. This factor is the ability to suppress the attractiveness of competing activities. For example, in order to finish writing this chapter, I need to put thoughts of alternative activities out of my mind. Kuhl (1985) refers to this process as the shielding of an intention. Bandura's (1986) research suggests that people who are confident of their abilities to succeed are better able to shield their intentions than are those who are plagued by doubt. They are less apt to become distracted or enticed by competing activities. This, then, constitutes another avenue through which self-efficacy beliefs affect performance.

3. *Self and the Comparison Process*

After working on some activity, people monitor their behavior and compare their performance against some reference value or standard. This comparison process is an important part of the self-regulation process. It tells us whether or not we are making progress toward our goal and what, if any, kinds of adjustments need to be made.

Earlier we noted that self-awareness is an important element of this process. People are more apt to compare their current behavior with a relevant standard when their attention is focused on themselves than when their attention is focused on the environment (Carver & Scheier 1981; Duval & Wicklund, 1972).

A study by Scheier and Carver (1983) tested the hypothesis that self-awareness increases the likelihood that people will compare their present behavior against a relevant standard. The subjects in this study were asked to reproduce a series of geometric shapes from memory. To help them with the task, they were allowed to momentarily view the geometric shape as many times as they wished. The number of times subjects asked to view the shape was used as an index of the degree to which they were comparing their present behavior (i.e., their drawing) against a standard.

To determine whether self-awareness affects this comparison process, Scheier and Carver (1983) experimentally manipulated the extent to which the participants' attention was focused on themselves. Half of the participants performed the task in front of a mirror, in which their own reflection was visually salient. The remaining participants did not perform the task in front of a mirror. On the assumption that seeing oneself in a mirror focuses one's attention on oneself, and that self-awareness leads people to compare their present behavior against a relevant standard, Scheier and Carver predicted that participants situated in front of the mirror would examine the geometric shapes more frequently than would participants who were not situated in front of the mirror. This proved to be the case. Although there are alternative explanations for this finding, the data are consistent with the claim that self-awareness leads people to compare their present situation with a relevant standard.

4. *Self, Expectancies, and Behavioral Adjustment*

After comparing their performance with a relevant standard, people form an expectancy regarding the likelihood that future efforts will meet with success. They then adjust their behavior. Broadly speaking, this adjustment involves persistence (continued

striving toward the goal, perhaps with a different strategy) or disengagement (quitting or otherwise psychologically withdrawing from the task) (Carver & Scheier, 1981).

Self-relevant phenomena influence which route people take. As noted earlier, people who have high self-efficacy beliefs persist longer and work harder at attaining their goals than do those with low self-efficacy beliefs (Bandura, 1986). In a similar vein, people who have favorable possible selves persist longer than do people who have failed to forge a connection between themselves and their goals (Markus & Nurius, 1986).

Attentional processes also enter into the relation between expectancies and behavioral adjustment (Carver & Scheier, 1981). When expectancies are favorable, self-awareness promotes high effort and high persistence; when expectancies are unfavorable, self-awareness leads to low effort and low persistence. Formally, we say the two variables (expectancies and self-awareness) interact. The effect of one variable depends on the other variable. Whether self-awareness leads to more or less effort depends on whether expectancies are favorable or unfavorable.

An investigation by Carver, Blaney, and Scheier (1979) demonstrates these effects. All of the participants in this experiment first performed poorly on a set of difficult anagram problems. This was done to ensure that a discrepancy between current behavior and some standard (a desire to do well) was present. The participants were then told that they would be taking a second test. Half of the participants were led to believe that they were likely to do very well on the second test (high expectancy condition) and half were led to believe that they were likely to do very poorly on the second test (low expectancy condition). After receiving this information, the second test was administered. Half of the participants took the test while seated in front of a large mirror (the high self-awareness condition); the remaining participants took the test under controlled conditions, with no mirror present (the low self-awareness condition). These manipulations enabled the investigators to experimentally vary participants' expectancies of success at the second task and their level of self-awareness.

The results of this study are shown in Figure 6.2. The figure shows that participants with high expectancies of success were more persistent when seated in front of a mirror, but that participants with low expectancies of success were less persistent when seated in front of a mirror. These findings support the contention that self-awareness promotes persistence when expectancies are high but leads to withdrawal when expectancies are low.

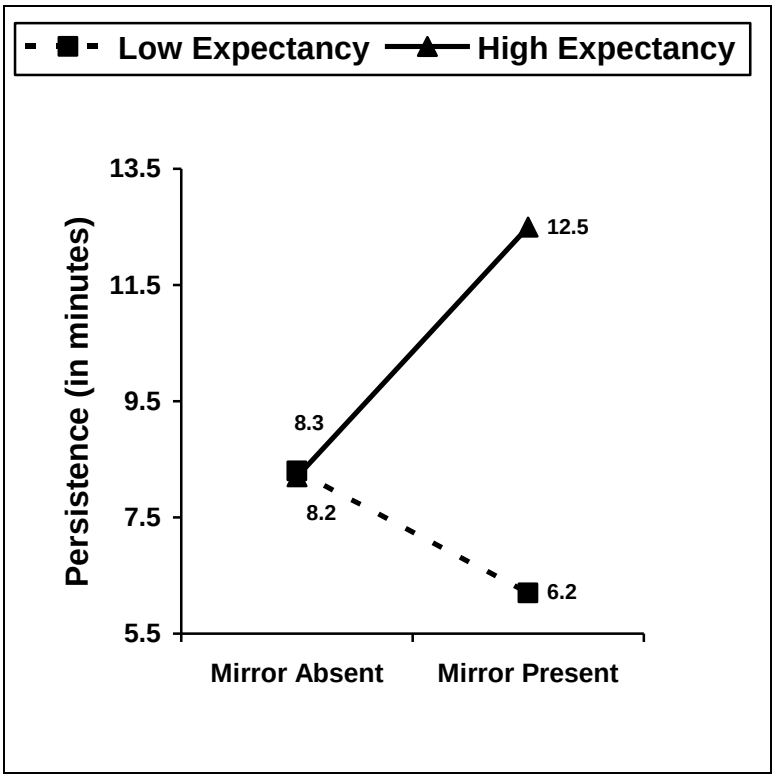

Figure 6.2. Task persistence, expectancies, and self-awareness **Participants with high expectancies of success persisted longer at the task when self-awareness was high than when it was low, but participants with low expectancies of success did just the opposite. These findings support the claim that self-awareness has positive effects when expectancies are favorable, but negative effects when expectancies are unfavorable. (Source: Carver, Blaney, & Scheier, 1979, *Journal of Personality and Social Psychology*, *37*, 1859–1870)**

Scheier and Carver (1982a) extended these findings in a subsequent investigation. They began by noting that people vary with regard to how much they generally think about themselves. Some people are very aware of themselves and spend a lot of time examining their thoughts and feelings. These individuals are said to be high in private self-consciousness. Other people are not very attentive to themselves and are less introspective. These individuals are said to be low in private self-consciousness.

Table 6.2 presents the scale Scheier and Carver used to measure these differences.

Table 6.2. Private Self-Consciousness Scale

Please indicate the extent to which each of the following items describes you by choosing one number on the rating scale next to each item.

	0	1	2	3	4
	extremely uncharacteristic				extremely characteristic
1. I'm always trying to figure myself out.	0	1	2	3	4
2. Generally, I'm not very aware of myself.	0	1	2	3	4
3. I reflect about myself a lot.	0	1	2	3	4
4. I'm often the subject of my own fantasies.	0	1	2	3	4
5. I never scrutinize myself.	0	1	2	3	4
6. I'm generally attentive to my inner feelings.	0	1	2	3	4
7. I'm constantly examining my motives.	0	1	2	3	4
8. I sometimes have the feeling that I'm off somewhere watching myself.	0	1	2	3	4
9. I'm alert to changes in my mood.	0	1	2	3	4
10. I'm aware of the way my mind works when I work through a problem.	0	1	2	3	4

Note: To determine your score, reverse the scoring for items 2 and 5 (0 = 4, 1 = 3, 2 = 2, 3 = 1, 4 = 0), and then add up your score to all 10 items. The higher the score, the higher your level of private self-consciousness. (Source: Fenigstein, Scheier, & Buss, 1975, *Journal of Consulting and Clinical Psychology*, *43*, 522–528.

Scheier and Carver (1982a) wanted to see whether individual differences in private self-consciousness produce effects comparable to those found with situationally induced variations in self-awareness. Toward this end, they adapted the procedures of the Carver et al. (1979) study, using scores on the private self-consciousness scale in place of the experimental manipulation of self-awareness. The findings paralleled the data displayed in Figure 6.2: High scores on the private self-consciousness scale were associated with high persistence when expectancies were favorable, but low persistence when expectancies were unfavorable.

Self-awareness and expectancies not only influence task persistence, they also interact to affect task performance. Self-awareness leads to superior performance

among people with high expectancies of success, but it leads to inferior performance among people with low expectancies of success (Brockner, 1979; Carver & Scheier, 1982b). These findings provide further evidence that self-focused attention can have beneficial effects when expectancies are favorable, but detrimental effects when expectancies are unfavorable.

5. *Self, Emotion, and Behavioral Adjustment*

Earlier we noted that in addition to forming expectancies of success, people also react emotionally to their task performances. They feel happy and proud or unhappy and dejected. The source of these feelings and the role they play in guiding behavior is the subject of some debate. One possibility is that the perceived distance from a goal is the critical determinant of emotion. Positive emotion arises when goals are judged to be within reach; negative emotion arises when goals are judged to be out of reach.

Carver and Scheier (1990) have offered an intriguing modification of this position. They have argued that the perceived rate of progress toward a goal is a more important determinant of emotion than is the absolute distance from a goal. Positive emotion arises when people believe they are making adequate progress toward their goals; negative emotion arises when people believe they are not making adequate progress toward their goals. This means that people can still feel good when they are far from their goals, as long as they perceive that they are making progress. For example, an aspiring pianist who has "playing Carnegie Hall" as her goal may feel elated after her first piano recital because it signifies that she is on her way. Research testing these ideas has just begun, but the evidence suggests that both factors (i.e., distance from the goal and progress toward it) influence emotion (Hsee & Abelson, 1991; Hsee, Salovey, & Abelson, 1994).

Another unresolved issue is the extent to which the emotional reaction (whether it be determined by distance from the goal or rate of progress) guides behavioral adjustment. As noted earlier, Duval and Wicklund (1972) proposed (1) that negative emotion arises whenever people become aware of a discrepancy between their current state and a relevant standard and (2) that this negative emotion is the main force that drives further attempts at discrepancy reduction. A similar position has been espoused by Pyszczynski and Greenberg (1987b).

Bandura (1986) has also argued that emotions play a critical role in the behavioral regulation process. In addition to discussing the role of negative emotions, he emphasizes that positive emotions, such as pride and self-satisfaction, motivate behavior by virtue of their capacity to function as positive reinforcers. The idea is that people are motivated to experience these positive emotions and that they regulate their behavior in an attempt to maximize these feelings of self-worth. For Bandura, these feelings, not information, govern people's behavior.

Carver and Scheier (1981) disagreed with these positions. They maintain that informational factors, not emotional ones, guide the self-regulation process. If people believe that further efforts at discrepancy reduction will be successful, they persevere; if people do not believe that further efforts at discrepancy reduction will be successful, they withdraw and quit. People may also experience various emotions when making these decisions, but the emotions themselves play no role in guiding behavior. The only

important factor to consider, according to Carver and Scheier, is the expectancy of success.

6. *Summary*

To summarize, the self is implicated in virtually all aspects of the self-regulation process. Table 6.3 documents this involvement. Self-relevant phenomena influence (1) goal selection, via their effect on people's values and expectancies; (2) preparation for action, via their effect on information seeking, practice, and mental rehearsal; and (3) goal attainment, via their effect on various aspects of the cybernetic cycle of behavior.

Table 6.3. **Summary of the role self-relevant phenomena play in the self-regulation process**.

I. **Goal Selection** (Within an expectancy-value framework)

A. Self and Expectancies

1. Self-efficacy beliefs: People undertake activities they believe they can successfully complete and avoid activities they think they cannot successfully complete.
2. Possible selves: People who can vividly imagine themselves succeeding hold higher expectancies of success than do those who lack such an image.

B. Self and Values

1. Current self-conceptions imply values (e.g., a person who thinks of herself as an artist values artistic pursuits).
2. Possible selves (future self-conceptions) influence values. People want to think of themselves a certain way. Anything that promotes these possible selves assumes value. For example, attending medical school assumes value for a person who wishes to think of himself as a physician.
3. Goals construed at broad, abstract levels almost always implicate the self. For example, a person may be striving to "be independent" or to "be a good person."

II. **Preparation for Action**

A. Gather Information: People with high self-efficacy beliefs engage in greater information-seeking than do those who doubt their ability to succeed.

B. Mental Rehearsal: People with high self-efficacy beliefs and people with clearly articulated possible selves are able to imagine themselves succeeding. These images, in turn, generally make success more likely.

C. Practice: People with high self-efficacy beliefs spend more time in preparation than do those with low self-efficacy beliefs.

III. **Cybernetic Cycle of Behavior**

A. Initial Behavior

1. Ability — a component of personality, not self-relevant.
2. *Effort* — self-efficacy beliefs influence how long and how hard people try.
3. *Strategy* — self-efficacy beliefs and possible selves influence strategies, particularly the ability to tune out distracting thoughts and suppress competing activities.
4. *Luck* — not influenced by self.

B. Observe Behavior (Not directly related to self-relevant processes).

C. Compare against some standard: Self-focused attention: People are more apt to compare their current behavior with a relevant standard when self-awareness is

high.

D. Expectancy

1. Self-efficacy beliefs: People who believe they have the ability to succeed are more optimistic that they can overcome obstacles to goal attainment than are those who doubt their ability to succeed.
2. Self-awareness: Self-awareness and expectancies interact to influence whether a person persists or withdraws. When expectancies are favorable, self-awareness leads to persistence; when expectancies are low, self-awareness leads to withdrawal.

E. Emotional reaction

1. Duval and Wicklund (1972) believe that emotion is a critical component of the self-regulation process. Becoming aware of a discrepancy produces negative emotion which people are motivated to reduce.
2. Bandura (1986) also believes that emotion is critical to the self-regulation process. He has emphasized that self-relevant emotions (e.g., feelings of pride for finishing a job) serve as powerful incentives and reinforcers.
3. Carver and Scheier (1981) believe that emotion is not a critical component of the self-regulation process.

F. Behavioral Adjustment

III. Applications to the Achievement Domain

The theoretical ideas we have been discussing in this chapter have been applied to a wide range of human behaviors. One of the most commonly studied areas is performance in achievement-related situations. In this section, we will consider three ways in which people's thoughts and feelings toward themselves influence their performance at achievement tasks.

A. *Defensive Pessimism*

I had a friend in college who used to exasperate me. Before every test, she would tell me how nervous she was and how bad she was going to do. Invariably, she would then proceed to set the curve for the test by getting the highest score. The first few times this happened, I figured my friend was just trying to save face in case she did poorly on the test. But as I got to know her better, I realized this strategy of expecting the worst was an important element in her success.

Norem and Cantor (1986; Cantor & Norem, 1989) coined the term defensive pessimism to describe my friend's behavior. Despite having a history of success in achievement situations, defensive pessimists doubt their ability to succeed in the future. Instead of imagining themselves doing well, they exaggerate their odds of failing and dwell on all the ways things could go wrong.

This does not mean that defensive pessimists adopt a passive, "what's the use" attitude. In fact, just the opposite is true. Focusing on potential problems prods defensive

pessimists to make sure these calamities don't occur. This is the key component to making defensive pessimism work. Defensive pessimists feel anxious and out of control when they approach a performance situation. To quell their anxiety, they painstakingly work through all the ways things could go wrong, and then "cover their bases" by taking active steps to avoid these pitfalls. In this manner, imagining the worse motivates the defensive pessimist to work harder and perform better.

An investigation by Spencer and Norem (1996) showed how important these strategies are to a defensive pessimist. Spencer and Norem had participants perform a test of manual dexterity (a dart-throwing task). Before the performance, participants were randomly assigned to one of three mental rehearsal conditions. Participants in a mastery-imagery condition were asked to imagine themselves turning in a stellar performance, entirely free of mistakes. Participants in the coping-imagery condition were asked to imagine they had made some mistakes during the performance, and then to think about how they would recover from those mistakes and make necessary corrections. Another third of the participants (i.e., those in a relaxation-imagery condition) were instructed to relax prior to the performance.

Spencer and Norem (1996) reasoned that although most people perform best when they imagine themselves succeeding, defensive pessimists perform best when they are given the opportunity to plan for how things could go wrong. This proved to be the case. Defensive pessimists performed better in the coping-imagery condition than in either of the other two conditions. These results show that high expectations of success do not always improve performance. For some people, imagining worst-case scenarios can be beneficial, as long as this pessimism is accompanied by active attempts to find solutions.

B. *Goal Orientations in Achievement Settings*

Expectancies of success are not the only factor that influences performance in achievement settings. The goals individuals pursue also affect performance. Research by Carol Dweck and her colleagues is particularly relevant to some of the ideas we have been discussing in this chapter (for reviews, see Dweck, 1991; Dweck & Leggett, 1988).

Dweck's early work was conducted with young children. At the beginning of an experimental session, the children were given several problems to solve. All of these problems were of easy or moderate difficulty, and the children were able to solve most of them. Later, the children were given a very difficult problem to solve. Dweck noted strong differences in how the children responded to this challenge. Some of the children exhibited signs of helplessness. These helpless-oriented children (as Dweck refers to them) became frustrated and angry, and they indicated that they did not want to continue working on the task. Other children were more mastery oriented. They became interested and engaged in the activity, and they expressed a strong desire to keep working on the task, often increasing their efforts to solve the problem. Interestingly, these differences did not depend on ability level. On average, the helpless-oriented children did not have lower ability (as measured by performance on the set of initial problems) than did the mastery-oriented children.

The key question to Dweck and her colleagues was "why?" Why do some children

respond to obstacles with frustration and withdrawal, while others respond to obstacles with excitement and engagement? Dweck hypothesized that the goals individuals adopt when entering an achievement situation guide the way they respond to performance feedback (see also, Ames & Ames, 1984; Nicholls, 1984). According to Dweck, helpless-oriented children adopt performance goals in achievement settings. Their goal is to demonstrate competence—to prove to themselves and others that they are intelligent and capable. In contrast, mastery-oriented children adopt learning goals in achievement settings. Their goal is to cultivate competence—to acquire knowledge, attain skills, and grow and develop as an individual.

Dweck's research has shown how these different goal orientations shape people's reactions to achievement setbacks (Dweck & Leggett, 1988). People with performance goals generally respond poorly to obstacles and setbacks. They view poor performance as an indication that they lack ability, and they disengage from the task and quit. People with learning goals show a different reaction. Instead of attributing failure to a lack of ability, they attribute it to insufficient effort or an ineffective strategy; and instead of viewing setbacks as threats to be endured, they view them as challenges to be mastered.

In her more recent work, Dweck has considered how these different goal orientations develop. She believes that the goals are a product of the theories people hold about the nature of intelligence. People with performance goals hold an entity theory of intelligence. They view intelligence as a fixed, immutable quality. Intelligence is something you either have or don't have (like blue eyes), and your goal in an achievement setting is to demonstrate that you have it. People with learning goals adopt an incremental theory of intelligence. They view intelligence as a fluid, malleable quality that can be developed and cultivated. This perspective leads them to enter achievement situations with the goal of increasing their ability level, of becoming more proficient and skillful.

Table 6.4 summarizes the two different orientations and shows how different theories about the nature of intelligence influence people's performances in achievement settings. One thing is missing from Table 6.4, however. Performance goals aren't always maladaptive. Elliott and Dweck (1988) found that people who hold performance goals and believe their ability is high actively seek opportunities to demonstrate this competence and do not shy away from challenging tasks. This suggests that performance goals are detrimental only when they are accompanied by low perceptions of competence (see also Harackiewicz & Elliot, 1988).

Table 6.4. Summary of Helpless- and Mastery-Oriented Achievement Orientations

Achievement Orientation	Theory of Intelligence	Dominant Goal	Attributions	Task Preference	Persistence and Performance
Helpless	Entity (Intelligence is fixed)	Performance (goal is to demonstrate competence to self and others)	Ability	Avoid challenging tasks that threaten to reveal low ability	Quit easily in the face of difficulty; show performance decrements when confronting obstacles and setbacks.
Mastery	Incremental (intelligence is malleable)	Learning (goal is to cultivate competence and increase skills)	Strategy or effort	Seek challenging tasks that foster learning and skill acquisition	Remain focused on task in the face of difficulty; maintain a high level of performance when confronting obstacles and setbacks.

C. *Intrinsic versus Extrinsic Motivation*

The goal orientations Dweck describes are closely related to another issue of importance in achievement settings. This is the issue of whether behavior is motivated from within (i.e., intrinsically motivated) or driven by a desire to gain external rewards (i.e., extrinsically motivated). People who are intrinsically motivated strive to do well in achievement situations for personal reasons. They take pleasure in learning and find the educational process to be inherently interesting and enjoyable. People who are extrinsically motivated strive to do well in achievement situations in order to gain external rewards. These rewards can include positive attention from teachers, parents, or peers, or material rewards, such as money or related privileges (e.g., you can use my car if you maintain a 3.0 average).

1. *Extrinsic Motivation Impairs Task Performance*

Although the differences are not always large, students who are extrinsically motivated tend to perform worse in school than students who are intrinsically motivated (Deci, Vallerand, Pelletier, & Ryan, 1991). An extrinsic orientation can also dampen creativity. In one experiment, Amabile (1985) randomly assigned some students in a creative-writing class to focus on extrinsic reasons for writing (e.g., the market for freelance writers is expanding; you enjoy public recognition of your work). Another group was led to focus on the intrinsic rewards associated with writing (e.g., I write because I like to express myself; I feel relaxed when I write). A third group was given no instructions. Later, all three groups of students wrote a poem, and the poems were rated for creative expression by an independent set of judges.

Figure 6.3 shows that students who were in the extrinsic motivation condition wrote poems that were less creative than those written by students in the other two conditions. Along with the results from other investigations (e.g., Amabile, 1983; Amabile, Hill, Hennessey, & Tighe, 1994), these findings reveal that extrinsic motivation can stifle creativity.

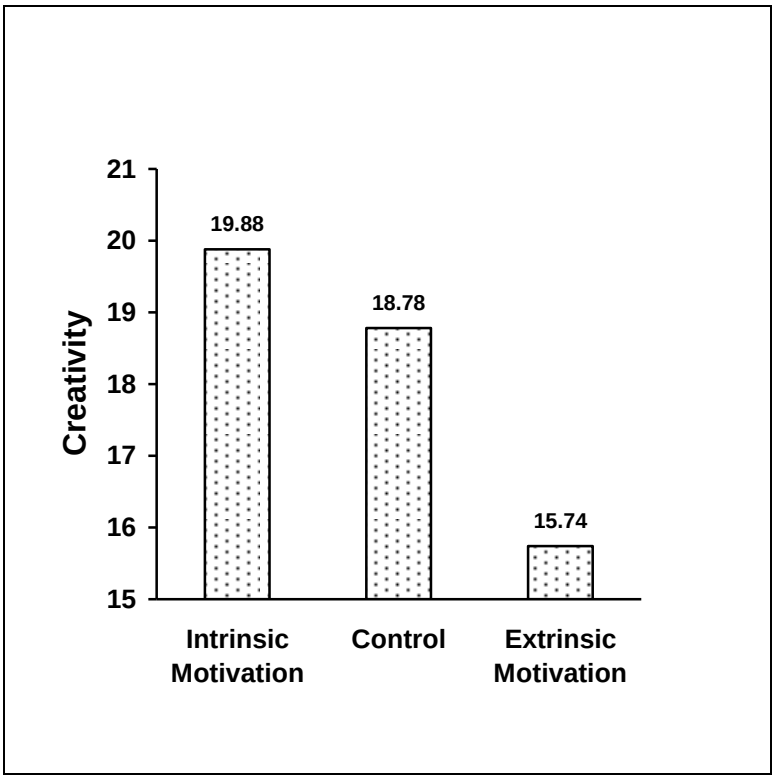

Figure 6.3. Creativity and motivation**. Students in a creative-writing class were asked to write a poem under one of three conditions: Some were instructed to focus on intrinsic enjoyment, some were instructed to think about extrinsic incentives, and some were in a control condition and were given no instructions. Later, the poems were judged for their creativity. The data show that students who wrote poems after thinking about extrinsic incentives wrote less creative poems than students in the other two conditions. (Source: Amabile, 1985, *Journal of Personality and Social Psychology*, *48,* 393-399)**

2. *Extrinsic Motivation Undermines Intrinsic Interest*

Thinking too much about external rewards can have other negative consequences. For example, Lepper, Greene, and Nisbett (1973) found that students who perform an activity with the expectation of receiving an award subsequently show less interest in the activity than students who perform the activity without the promise of an external reward. In this study, nursery school children were encouraged to draw with some felt-tip markers. One-third of the children were in the expected-reward condition. These children were told they would receive a reward (in the form of a special certificate) if they drew with the markers. Another one-third of the children were in the unexpected-reward condition. They also received a reward for playing with the markers, but they didn't know they were going to get it when they chose to play with the markers. Finally, children in a control condition neither expected nor received an award for playing with the markers.

Several days later, the children were brought back into the laboratory and were given the opportunity to play with a number of attractive toys, including the felt-tip markers. No rewards were mentioned or administered during this phase of the experiment. To measure intrinsic interest, the researchers noted the amount of time the children spent playing with the markers during this free period. Consistent with the claim that external rewards can dampen intrinsic motivation, the data shown in Figure 6.4 reveal that the children in the expected-reward condition spent less time playing with the markers during the second stage of the experiment than did children in the other two conditions (for related research, see Boggiano & Main, 1986; Higgins, Lee, Kwon, & Trope, 1995).

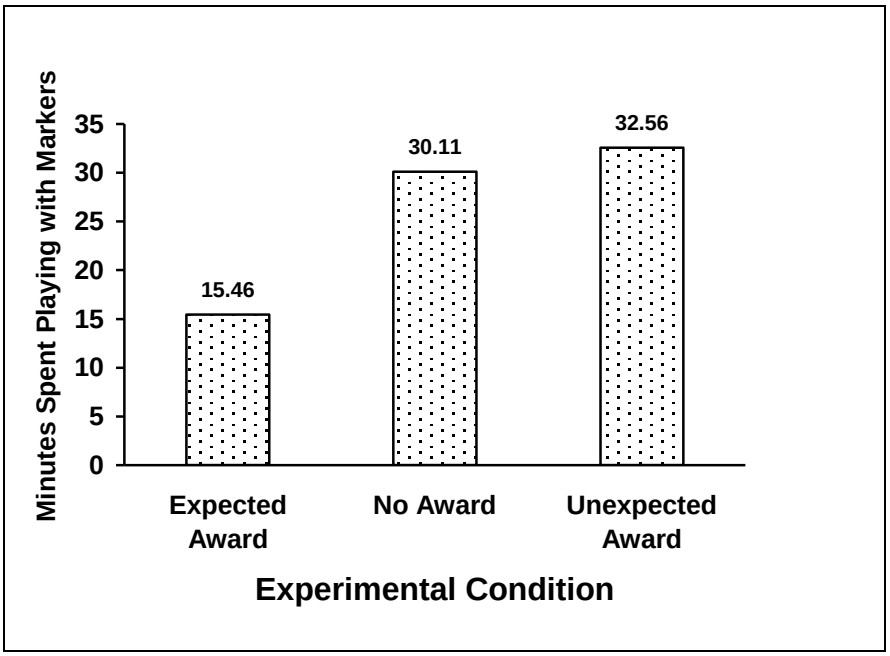

Figure 6.4. Rewards and the Undermining of Intrinsic Motivation**. Children who earlier had received an expected reward for playing with felt-tip markers subsequently showed less interest in the markers than did children who received either an unexpected reward or no reward at all. These findings document that expected rewards can undermine intrinsic motivation. (Source: Lepper, Greene, & Nisbett, 1973, *Journal of Personality and Social Psychology*, *28,* 129-137)**

Fortunately, external rewards do not always undermine intrinsic motivation. Deci (1975) noted that external rewards contain two components. On the one hand, they can function as a bribe and reduce freedom by coercing people to behave in ways they normally would not. At the same time, external rewards can provide important information about the quality of one's efforts and accomplishments (as when a person receives a reward for trying hard or for turning in an exemplary performance). Rewards appear to undermine intrinsic interest *only* when the controlling aspect of the reward is more prominent than its informational value (Ryan, Mims, & Koestner, 1983). This means that rewarding someone for a job well done does not necessarily diminish the person's enthusiasm for performing the task (Eisenberger, Armeli, & Pretz, 1998; Eisenberger, Rhoades, & Cameron, 1999). The same is true of praise. Verbal reinforcement heightens enjoyment when it is sincere and promotes choice and autonomy (Henderlong & Lepper, 2002), but dampens enthusiasm

when it is controlling and conditional (Assor, Roth, & Deci, 2004).

It is interesting to consider this distinction with respect to a reading program being conducted in Tifton, Georgia. This town has undertaken a quest to become the Reading Capital of the World (http://www.readingcapital.com). To achieve this aim, the town offers monetary rewards to citizens who read. The program is a huge success, as the town's inhabitants are reading much more than they did before the program was initiated. The question arises, however, as to whether rewarding people in this manner will undermine their intrinsic enjoyment of reading. The developers of this program think not. They note that the rewards are given only when readers demonstrate competency. To receive a reward, the reader must pass a comprehension test for every book he or she reads. Because these rewards convey information about performance standards, they are unlikely to dampen people's enthusiasm for reading.

IV. Self-Regulation Failure

To this point, we have focused on how self-relevant processes promote successful self-regulation. People are not always successful in their efforts to regulate their own behavior, however. Indeed, many of the problems that currently plague American society—alcoholism, domestic violence, drug use, drunk-driving, excessive gambling, smoking, and unsafe sexual practices—reflect, to some extent, people's inability to control themselves. Even our national debt represents an inability to control our collective spending.

Using principles discussed in this chapter, Baumeister, Heatherton, and Tice (1994; see also Baumeister & Heatherton, 1996) have developed a theoretical model of self-regulation failure. The model begins by assuming that people must often choose between conflicting goals. A person wants to save for the future and buy a new CD player; a person wants to act responsibly and gratify sexual desires. Successful self-regulation occurs when higher-order goals and desires (the desire to save money and act responsibly) override or supersede lower-order impulses and desires (the desire to own a new stereo or satisfy sexual urges).

As noted earlier, higher-order goals are ones that involve self-images (Vallacher & Wegner, 1987). They represent the way people wish to think of themselves; the kind of person they want to be. Successful self-regulation requires activating these superordinate, higher-order goals and making sure they are sufficiently strong to guide behavior.

Baumeister et al. (1994) refer to this process as one of transcendence. Transcendence occurs when individuals are able to see beyond the present situation (which may offer immediate gratification) and focus upon more distant goals involving desired self-images. A person who focuses on how smoking will kill him in the long run is engaging in transcendence. He is focusing on distant concerns and ignoring the immediate gratification a cigarette would bring.

Finally, Baumeister et al. (1994) assume that a person's ability to transcend the present situation and override impulses and urges varies as a function of situational factors. These factors include fatigue, stress, and distraction. This approach does not deny that some individuals generally are more proficient at self-control than others (Mischel, Shoda, & Peake, 1988); it simply underscores that several factors can impede everyone's ability to regulate their

own behavior.

A. Negative Effects of Too Little Self-Awareness

One of these factors is a lack of self-awareness. As noted throughout this chapter, successful self-regulation demands that people compare their behavior against a relevant standard, and this comparison process is more apt to occur when people are aware of themselves. Anything that diminishes self-awareness, then, can hinder self-regulatory efforts.

1. Deindividuation and Moral Behavior

Deindividuation illustrates this effect. Deindividuation occurs when people lose their sense of individuality. Deindividuation tends to occur in group situations, and it is often accompanied by a loosening of moral behavior. For example, deindividuation has been shown to increase aggression (Mullen, 1986). The kind of rioting that can characterize a mob provides a suitable example. Being anonymous (or deindividuated) by virtue of their immersion in a group, normally law-abiding citizens can run amok and cause considerable financial and physical damage. The riots that sometimes occur following soccer games in Europe provide a fitting example of this phenomenon.

Deindividuation can also give rise to other forms of antisocial behavior. In one study, Diener and Wallbom (1976) gave college students an alleged intelligence test. The students were told they had only 5 minutes to work on the test, but that the experimenter would not be back for 10 minutes. This gave the students an opportunity to cheat on the test by working past the allotted time. Half of the students were seated in front of a large mirror while they worked on the test (and thus were in a state of heightened self-awareness); the remaining students (those in the low self-awareness condition) did not sit in front of a mirror. In accordance with the claim that diminished self-awareness undermines moral behavior, 71 percent of the students who took the test in the low self-awareness condition cheated on the test by working past the allotted time, but only 7 percent of the students who took the test in the high self-awareness condition did so. These and similar findings (e.g., Beaman, Klentz, Diener, & Svanum, 1979) suggest that people are less likely to act on higher-order moral principles when self-awareness is low.

2. Alcohol Consumption and Self-Regulatory Failure

Alcohol is implicated in many instances of self-regulatory failure. Domestic violence, aggression, unsafe sexual practices, and many other troublesome behaviors are more likely to occur when people have been drinking. There are many explanations for this effect, but one is that alcohol reduces self-awareness (Hull, 1981). When intoxicated, individuals become less aware of themselves, and they fail to compare their present behavior with appropriate, higher-order standards. Consequently, they do things they would ordinarily not do.

Hull, Levenson, Young, and Sher (1983) conducted a study to see whether alcohol reduces self-awareness. The participants in this study were asked to give a short speech, and the researchers took note of how often participants referred to themselves during the speech. Half of the participants consumed alcohol before giving the speech; the rest of the participants consumed tonic water. Consistent with the notion that alcohol reduces self-awareness, participants who drank alcohol referred to themselves less often during their

speeches than did participants who drank tonic water. Because self-awareness is an essential component of successful self-regulation, alcohol's ability to diminish self-awareness can explain why it is often associated with self-regulation failure.

There is another, related, way in which alcohol can lead to self-regulatory failure. Steele and Josephs (1990) have argued that alcohol restricts people's attention to immediate cues and reduces their ability to think abstractly. This tendency (which Steele and Josephs refer to as alcohol myopia) may explain why people fail to consider the broader implications of their actions when intoxicated. Instead of focusing on the general implications of their behavior (e.g., on what kind of person they want to be), they focus on the immediate pleasures of the action they are contemplating. In more formal terms, we can say that alcohol interferes with the transcendence process identified by Baumeister et al. (1994). This interference may explain why alcohol is implicated in so many instances of self-regulatory failure, including date rape and unsafe sexual practices (MacDonald, Zanna, & Fong, 1996).

Unfortunately, the positive effects of alcohol are also alluring. Alcohol not only makes people feel better physically (e.g., it relaxes them), it also makes people feel better about themselves. Banaji and Steele (1989) found that many people evaluate themselves more positively after they have ingested moderate amounts of alcohol. People also tend to drink after they have suffered a threat to their self-image, and doing so helps them feel better about themselves (Steele, Southwick, & Critchlow, 1981). These effects provide powerful psychological reasons for drinking alcohol.

B. *Negative Effects of Too Much Self-Awareness*

In the preceding section we discussed situations in which a lack of self-awareness can impair self-regulation. Somewhat paradoxically, too much self-awareness can also be harmful.

1. *Choking*

Choking provides one instance of this effect. Choking occurs when individuals fail to perform at optimal levels under conditions in which optimal performance is desired. Athletic competitions provide the prototypic example. The annals of sports lore abound with fabled stories of teams or individuals who have been in a winning position only to lose because of a series of flagrant errors. For example, the Australian golfer, Greg Norman, led by six strokes going into the final round of the 1996 Masters Golf Tournament. Despite having this commanding lead, Norman ended up losing by five strokes, largely due to a spate of errors he committed.

Baumeister (1984; Baumeister, Hamilton, & Tice, 1985) linked choking to heightened self-awareness. Baumeister argued that choking occurs when situational pressures (such as those induced by competition or the presence of an audience) heighten self-awareness. This increased attention to oneself leads people to compare their present behavior with a relevant standard and to think too much about what they're doing. This, in turn, interferes with the execution of well-learned, highly demanding skills. Interestingly, both anticipation of success (Baumeister & Steinhilber, 1984) and fear of failure (Schlenker, Phillips, Boniecki, & Schlenker, 1995) can increase self-awareness and produce choking.

2. *Stereotype Threat*

Steele and Aronson (1995) have used these ideas to explain racial differences in academic performance. There is considerable evidence that many Black Americans fail to perform up to their intellectual potential in achievement situations (Steele, 1992). Steele and Aronson suggested that heightened self-awareness may account for this effect. They argued that Black Americans feel intense pressure to perform well at achievement tasks in an attempt to disconfirm cultural stereotypes of intellectual inferiority. This pressure, which Steele and Aronson refer to as stereotype threat, increases self-awareness and ultimately undermines performance (i.e., causes choking).

To test their ideas, Steele and Aronson administered an intellectual test to Black and White college students. Before taking the test, half of the students were instructed to indicate their race on a pretest questionnaire; the other half of the students were not asked to indicate their race. Steele and Aronson assumed that asking students to indicate their race would make race salient and that, for Black students, racial salience would lead to heightened self-awareness and poor task performance.

Figure 6.5 presents the results for the task performance measure. After adjusting the scores for preexisting differences in verbal ability, Steele and Aronson found that African Americans who indicated their race performed worse on the task than African Americans who did not indicate their race. The opposite tended to occur among European Americans, although the effect was not significant. Although these findings do not establish that stereotype threat explains racial differences in achievement, they do show that African Americans suffer performance impairments when their race is salient (Sackett, Hardison, & Cullen, 2004).

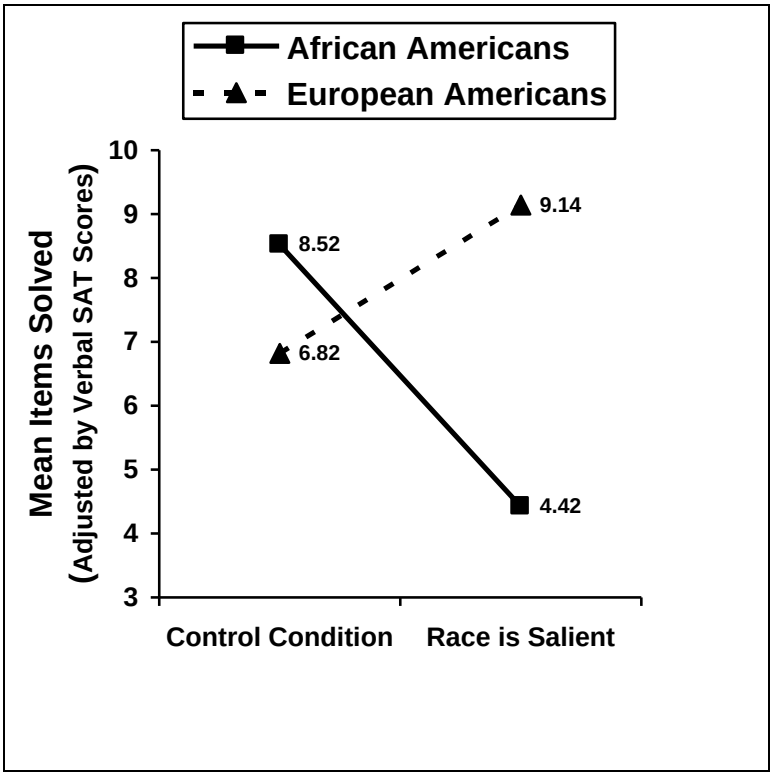

Figure 6.5. Stereotype Threat and Test Performance**. African Americans performed just as well as European Americans in the control condition, but performed more poorly when European Americans when they had first been asked to think about their race. These findings suggest that African Americans may sometimes suffer from stereotype threat in achievement-relevant situations. (Source: Steele & Aronson, 1995, *Journal of Personality and Social Psychology, 69,* 797-811, Study 4)**

Stereotype threat primarily affects students who identify strongly with doing well in school. If success means very little to a student, the student won't usually be vulnerable to stereotype threat. Because good students care most about doing well, this means that stereotype threat will have its greatest effect on the most promising students (Pronin, Steele, & Ross, 2004; Schmader, 2002). Moreover, stereotype threat can occur even when students have substantial confidence in their own ability to succeed. The stereotype applies to the group, not the individual, and a student needn't accept the stereotype in order to be susceptible to its negative effects. It is simply the threat of being judged by the stereotype that undermines performance. (Aronson, Lustina, Good, Keough, Steele, & Brown, 1999; Steele, 1997).

Finally, you don't have to be African American to suffer from stereotype threat. The phenomenon can occur for any group that is characterized by a negative stereotype. For example, common stereotypes maintain that European Americans are inferior to Asians in science and engineering and inferior to African Americans in athletic ability. Consistent with Steele's theory of stereotype threat, research has found that the task performance of European Americans suffers in these areas when they are reminded of these stereotypes (Stone, Lynch, Sjomeling, & Darley, 1997).

Fortunately, several steps can be taken to reduce the negative effects of stereotype

threat. First, stereotype threat can be attenuated by the presence of positive role models (Marx, & Roman, 2002; McIntyre, Paulson, & Lord, 2001). Apparently, being reminded that other people have persevered inspires minority students to rise above the stereotype and perform their best. Stereotype threat is also reduced when students are encouraged to view intelligence as a malleable quality that can be cultivated, rather than a fixed capacity one either has or does not possess (Aronson, Fried, & Good, 2002; Good, Aronson, & Inzlicht, 2003).

3. *Self-Destructive Behavior As Escape from Self-Awareness*

Excessive self-awareness has also been implicated in acts of self-destruction (Baumeister & Scher, 1988). Substance abuse provides the best example. Earlier we noted that alcohol reduces self-awareness (Hull, 1981) and that drinking alcohol can make people feel better about themselves (Banaji & Steele, 1989). Many people who drink to excess do so for these reasons. They turn to alcohol as a means of reducing self-awareness, particularly when things are going poorly in life (Hull & Young, 1983). Nearly 1,000 years ago, the Persian poet Omar Khayyam described the experience in this way:

> I drink not from mere joy in wine nor to scoff at faith—no, only to forget myself for a moment, that only do I want of intoxication, that alone.

Baumeister and Scher (1988) have argued that a desire to reduce self-awareness plays a role in many other acts of self-destruction (e.g., smoking, thrill seeking, and masochism). When self-awareness becomes too intense and aversive, people turn to these activities in an attempt to escape from themselves.

A desire to escape self-awareness may even underlie suicide. According to Baumeister (1990), suicide can arise when negative experiences, such as a business failure or the break-up of an important interpersonal relationship, lead to an intense state of heightened self-awareness. When other efforts to eliminate this aversive state fail to bring relief, people begin to contemplate suicide. For these people, suicide represents a last-ditch attempt to escape an acute state of self-awareness.

V. Chapter Summary

In this chapter we explored how self-relevant processes influence motivated behavior. We began by outlining a general model of self-regulation. This model is concerned with the goals people adopt and the manner in which people go about trying to attain their goals. We then identified three self-relevant processes that influence self-regulation. These are (1) self-efficacy beliefs (the extent to which people believe they have the ability to reach their goals); (2) possible selves (people's ideas about what they will be like in the future); and (3) self-awareness (the extent to which people's attention is focused on themselves or is focused on the environment). Finally, we reviewed research showing that these phenomena affect virtually every aspect of the self-regulation process.

Next, we discussed task performance in achievement situations. Most people function best when they imagine themselves succeeding and have high expectancies of success. But some people (called defensive pessimists) function best when they are allowed to think about all the ways things could go wrong. Task performance is also influenced by the goals people adopt in achievement settings. Some people strive to demonstrate to themselves and others that they are competent; other people strive to cultivate competence and to improve themselves. These different goal orientations influence people's responses to setbacks and obstacles. In a similar vein, some people are motivated by intrinsic (or personal) concerns when they enter an achievement situation, whereas others are driven to gain external rewards or attention from others. Under some circumstances, an extrinsic orientation can stifle creativity and reduce task enjoyment.

Finally, we looked at situations in which self-relevant processes can interfere with self-regulatory efforts. Here we saw that both a lack of self-awareness and an excess of self-awareness can lead to self-regulatory failure.

- Self-regulation models of motivated behavior are concerned with what individuals choose to do and how they go about trying to accomplish their goals. There are three aspects of the model: (1) goal selection (which can be understood in terms of an expectancy-value model); (2) preparation for action; and (3) a cybernetic cycle of behavior.
- Cybernetic models of behavior assume that people use information to regulate their behavior. After adopting a goal or standard, people periodically monitor their behavior and compare it against some standard. This comparison process yields (1)an expectancy that future efforts will be worthwhile, and (2)an emotional reaction. These factors, in turn, determine whether people continue to pursue their goals or abandon them.
- Self-efficacy beliefs refer to people's ideas about their ability to bring about desired outcomes. People with high self-efficacy beliefs are confident they have what it takes to succeed; people with low self-efficacy beliefs doubt their ability to succeed. These beliefs play an important role in the behavioral regulation process, influencing (1) the goals people adopt; (2) how thoroughly people prepare to attain their goals; and (3) how long, hard, and effectively people work at achieving their goals.

- Possible selves refers to people's ideas about what they will be like in the future. Some of these possible selves are positive; others are negative. Vivid and clearly defined possible selves affect goal selection by influencing what people value in life. Possible selves also help people to remain focused on their goals by suppressing the attractiveness of competing activities.
- Attentional focus varies from a state of heightened self-awareness to a relative lack of self-awareness. People whose attention is focused on themselves are more apt to compare their current state with a relevant standard than are people who are less aware of themselves. When expectancies are favorable, self-focused attention leads to high effort, continued persistence, and superior task performance; when expectancies are unfavorable, self-focused attention leads to low effort, a lack of persistence, and poor task performance.
- Defensive pessimists perform best in achievement settings when they are allowed to focus on all the ways things might go wrong. This occurs because planning for the worst reduces anxiety.
- Some people enter achievement situations with the goal of demonstrating to themselves and to others that they possess high ability. These individuals tend to believe that intelligence is a fixed quality that you either have or do not have. Other people enter achievement settings with the goal of cultivating competence. These individuals tend to believe that intelligence is a malleable quality that you can acquire and develop.
- External rewards can reduce creativity and undermine intrinsic interest in an activity. This occurs when the controlling aspect of the reward (I'll pay you if you do your homework) is more salient than the reward's informational value (here's a reward for doing such a good job on your homework).
- Self-awareness can interfere with effective self-regulation. When self-awareness is too low, people fail to compare their current behavior with appropriate higher-order standards. This can lead to aggression and irresponsible behavior (such as unsafe sexual practices). Excessive self-awareness can also be harmful. People who become too aware of themselves sometimes turn to self-destructive behaviors (such as drinking or thrill seeking) in an attempt to reduce self-awareness. In extreme cases, suicide can result when efforts to escape self-awareness fail.

VI. For Further Reading

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CLASSROOM PRACTICE GUIDE

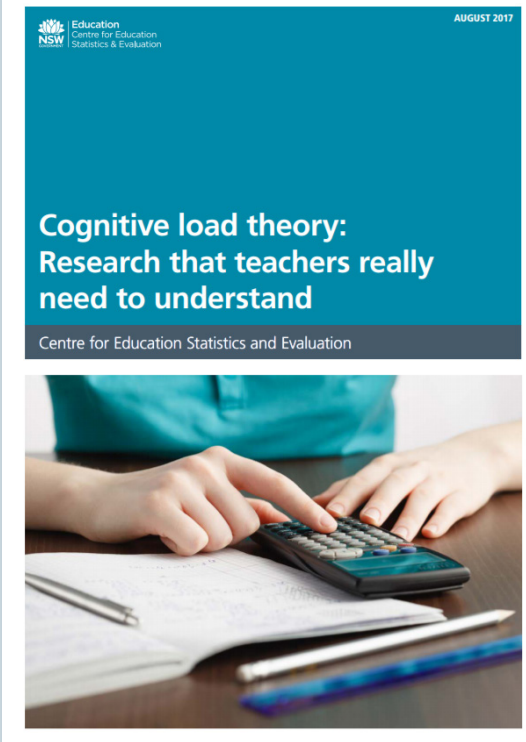
NSW GOVERNMENT

DEPARTMENT OF EDUCATION

Cognitive load theory in practice

Examples for the classroom

Centre for Education Statistics and Evaluation



More information

To read more about cognitive load theory and for references to the research this resource is based on, please see CESE's other publication, *Cognitive Load Theory: Research teachers really need to understand,* by visiting CESE's website:

www.cese.nsw.gov.au/publications

Cognitive load theory emerged from the work of educational psychologist John Sweller and colleagues from the 1980s, and has since developed into an influential learning theory supported by a robust evidence base. A more in-depth discussion of cognitive load theory and its effects can be found in:

John Sweller, Paul Ayres and Slava Kalyuga 2011, *Cognitive load theory*, New York, Springer-Verlag.

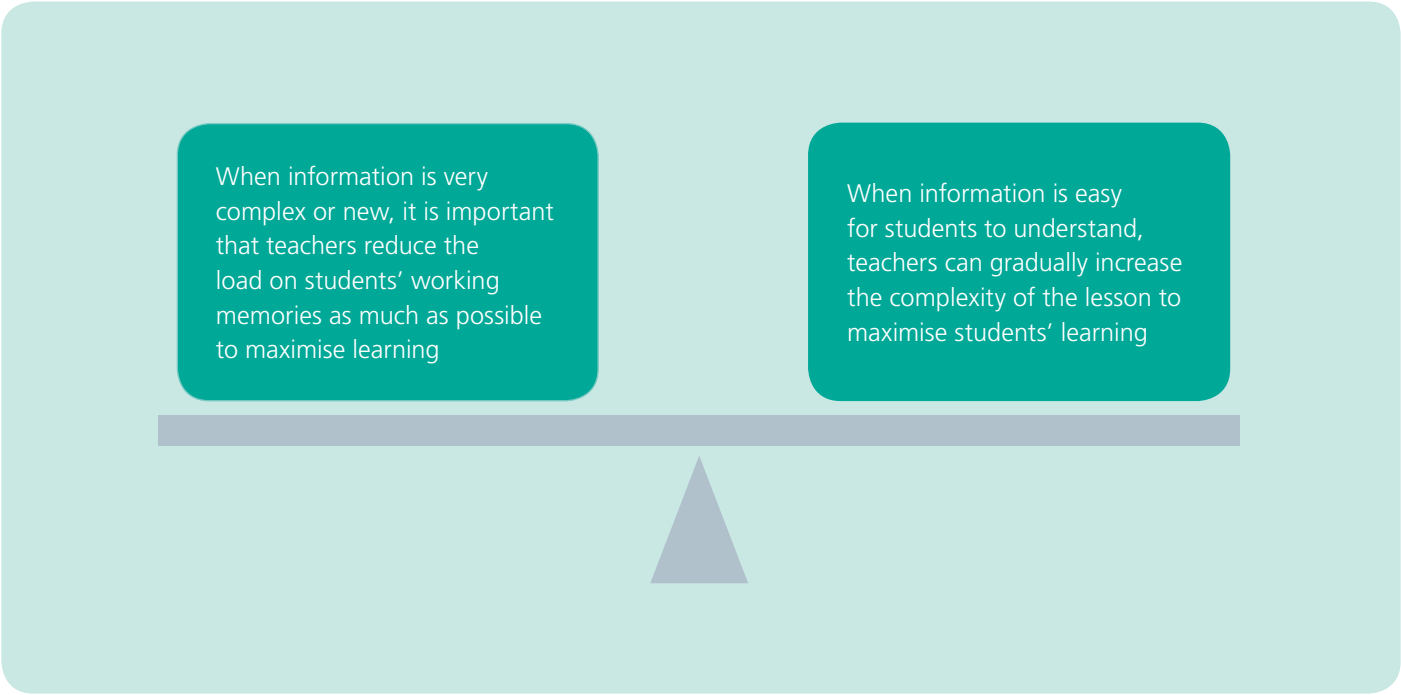
CESE wishes to thank Emeritus Professor Sweller for his comments on this publication.

Introduction: Cognitive load theory in practice

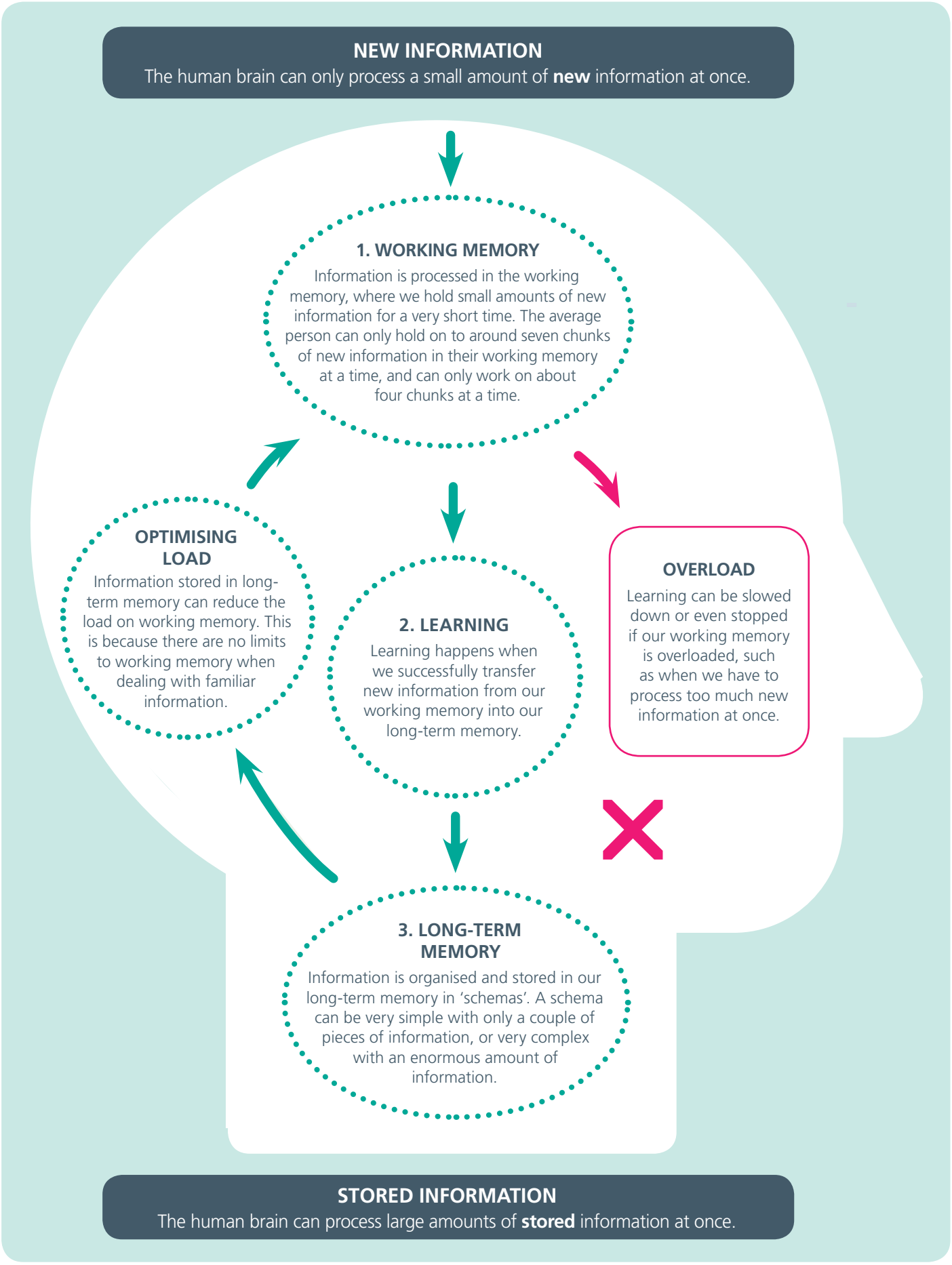
Understanding how human brains learn can help teachers to employ more effective teaching methods. This publication is designed to help teachers incorporate cognitive load theory into their teaching practice. It is intended to be a practical resource, and uses examples from the NSW syllabuses to illustrate how teachers can use cognitive load theory in the classroom.

What is cognitive load theory?

Dylan Wiliam has described cognitive load theory as 'the single most important thing for teachers to know'. Cognitive load theory uses knowledge of the human brain to design teaching strategies that will maximise learning. It provides theoretical and empirical support for explicit models of instruction, in which teachers show students what to do and how to do it, rather than having them discover or construct information for themselves. Cognitive load theory is about optimising the load on students' working memories to help maximise their learning.



How do human brains learn?



Teaching strategies from cognitive load theory

Cognitive load theory is supported by a robust evidence base which shows that students learn best when they are given explicit instruction accompanied by lots of practice and feedback. Through a significant number of randomised controlled trials (RCTs), researchers have identified a number of strategies that can help teachers to maximise student learning. These strategies work by optimising the load on students' working memories.

STRATEGY 1

Tailor lessons according to students' existing knowledge and skill

'Element interactivity effect'

STRATEGY 2

Use worked examples to teach students new content or skills

'Worked example effect'

STRATEGY 3

Gradually increase independent problem-solving as students become more proficient

'Expertise reversal effect'

STRATEGY 4

Cut out inessential information

'Redundancy effect'

STRATEGY 5

Present all the essential information together

'Split-attention effect'

STRATEGY 6

Simplify complex information by presenting it both orally and visually

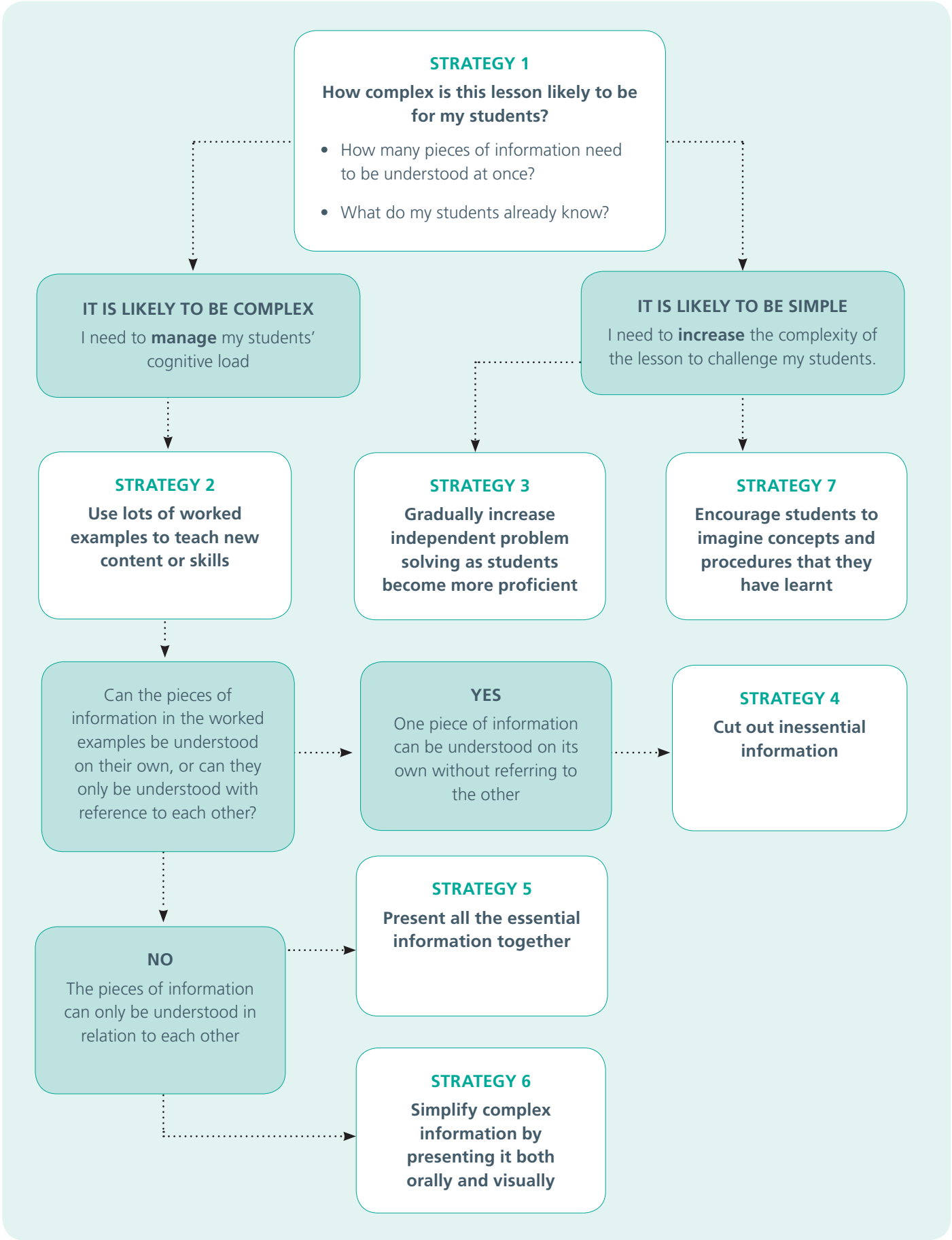
'Modality effect'

STRATEGY 7

Encourage students to visualise concepts and procedures that they have learnt

'Imagination effect'

Which strategy should I choose to optimise my students' cognitive load?



STRATEGY 1
Tailor lessons according to students' existing knowledge and skill

Students learn best when teachers tailor lessons to their existing knowledge and skill.

One of the most important implications of cognitive load theory for teaching practice is the need to optimise students' cognitive load, by striking the right balance between too much and too little load. To do this effectively, teachers need to have a strong understanding of where students already sit in their learning. When teaching a lesson that is relatively simple for students to understand, there is room in their working memories to process a little bit more information. In this case, teachers should aim to increase the complexity of the task to challenge their students. But when the task is already complex, there is no room in students' working memories to process any more information. In this case, teachers should focus on reducing the cognitive load.

Why is it effective?

The reason instruction is most effective when it is tailored to students' existing knowledge is because of how human brains learn and use knowledge. Human brains can only process a small amount of new information at once, but can process very large amounts of stored information. For this reason, drawing on information that is already stored in students' long-term memories can help reduce cognitive load – and thus result in more effective learning. By drawing on students' existing knowledge, and managing the amount of new information that students have to process at once, teachers can maximise student learning.

How can I use it in the classroom?

Teachers should consider two things when identifying whether a lesson is likely to place a heavy cognitive load on their students:

1. **The number of different pieces of information that need to be understood together to make sense of the material.**

   For example, the knowledge that one added to one equals two is not very complex, because it only has a few pieces of information that need to be understood together. On the other hand, an advanced arithmetic equation is quite complex because it has lots of different pieces that all need to be understood together.

2. **The prior knowledge of the student.**

   Information that is complex for a beginner might be simple for an expert. For example, a student who is just learning to read might find the task of reading the word 'cat' complex, but an expert reader will find this too easy and will benefit from being challenged more.

There are some techniques that teachers can use to make complex information more accessible for students. These include:

The 'part-whole approach'

The teacher breaks the complex task down into a series of sub-tasks, and gradually builds the students' skills at solving each sub-task before eventually bringing the sub-tasks together in the whole task.

The 'whole-part approach'

The teacher introduces the whole task to students from the beginning, but then directs their attention to each sub-task. This context can help students to understand how each of the sub-tasks interact with each other.

When teaching new content to students without much pre-existing knowledge, teachers should provide students with lots of detailed, fully guided instruction.

As the students' knowledge and skill increases, teachers should provide a mix of guided instruction and problem-solving practice.

Finally, as students become very proficient, teachers should provide minimal guidance and allow students to practise their skills with lots of problem-solving tasks. Some students will progress to independent problem-solving faster than others.

STRATEGY 1
Examples for the classroom

Example 1: Year 10 Science

A Year 10 science class is learning about Newton's Second Law and how the laws of physics can describe and predict the motion of objects. The aim of this lesson is for students to describe the relationship between force, mass and acceleration. Understanding the laws of physics is likely to place a heavy cognitive load on students' working memories, because they need to understand the concepts, the relationships between them, and the formula for Newton's Second Law. To help manage the students' cognitive load, the teacher decides to introduce Newton's Second Law using the part-whole approach.

What does it look like?

The teacher begins the lesson by recapping content that students have already covered in earlier stages of learning. She writes the four relevent concepts on the board – velocity, acceleration, mass and force – and asks the students to recall the definitions of each word as a class. She writes the correct definitions on the board.

- **Velocity** is the rate at which an object moves in a certain direction, calculated as 'metres per second'.
- **Acceleration** is the rate at which velocity changes (that is, speeds up or slows down), calculated as 'metres per second per second'.
- **Mass** is a measure of how much matter is in an object, indicating its resistance to acceleration when a force is applied. Mass is measured in kilograms.
- **Force** is a 'push' or 'pull' on an object resulting from interaction with another object, and is measured in 'Newtons'. One Newton is the amount of force required to accelerate an object with a mass of one kilogram one metre per second per second.

The teacher then introduces the students to the relationships between these different concepts. She checks their understanding by asking them to write out the tables in their workbooks and fill in the missing sections, before discussing the correct answers as a class.

Acceleration is directly proportional to net force. In other words, doubling the net force will result in a doubling of the acceleration, as long as the mass remains the same. Look at the table to the right. We can see that, as the numbers in the net force column double, so do the numbers in the acceleration column, as long as the mass remains the same.

Net Force (N)	Mass (kg)	Acceleration (m/s/s)
10	2	5
20	2	10
Net Force (N)	**Mass (kg)**	**Acceleration (m/s/s)**
40	2	20
80	2	?

Acceleration is inversely proportional to mass. In other words, doubling the mass of an object will result in a halving of the acceleration, as long as the force remains the same. Look at the table to the right. We can see that, as the numbers in the mass column double, the numbers in the acceleration column halve, as long as the net force remains the same.

Net Force (N)	Mass (kg)	Acceleration (m/s/s)
80	2	40
80	4	20
80	8	10
80	?	5
80	32	?

Next, she introduces the students to Newton's Second Law:

Force = mass x acceleration

Finally, she provides the students with lots of worked examples to practise using this formula to predict how force affects the movement of an object (see 'Strategy 2: Use worked examples to teach students new content or skills', page 9).

By presenting the lesson on Newton's Second Law using a part-whole approach, the teacher has managed the cognitive load of her students. Rather than overloading them with lots of new information that all needs to be understood at the same time, the teacher introduced her students to one set of new information at a time. By the time they reach the whole task – of using Newton's Second Law to predict how a force affects the movement of an object – the students are already familiar with the vocabulary, and the relationships between the different elements.

Example 2: Year 4 English

A Year 4 English class is learning to compose, edit and present imaginative texts, with a focus on narratives. The students have been learning about language features such as similes, and the aim of this lesson is for students to practise using similes in a piece of imaginative writing. The teacher knows that this task can place a heavy cognitive load on the students' working memories, because it requires them to think about many different things at once. As well as recalling what a 'simile' is and thinking of some relevant similes to add meaning and interest to their story, the students are required to think about the story they want to communicate, the organisation of ideas and text structure, and the appropriate vocabulary and syntax – all while monitoring these different elements to ensure they are appropriate for their intended audience. To help manage his student's cognitive load, the teacher decides to break the task down by using a genre with which they are familiar, using modelled writing, and using lots of scaffolded questions and tasks.

What does it look like?

In the first part of the lesson, the teacher recaps what a simile is. He asks the class if they can remember the definition of a simile and writes the correct definition on the board.

Simile: A description comparing one thing with another. Usually starts with 'as' or 'like'.

He then reads a familiar text to the class, asking students to put their hand up when they hear a simile. Next, he displays a picture of a monster and brainstorms some similes with students that describe what each of the monster's body parts looks like. He writes these on the board.

Hair like a mop

Nose like a beak

Hands like claws

Teeth as sharp as razors

A voice like a hissing snake

He asks the class to draw their own scary monster, and then asks them to think of three similes that describe their monster and write these in their workbooks.

Next, the teacher uses a process of 'thinking aloud' to model for the students how to write a passage of text using similes to describe a scary character.

"I'm going to start with a description of our monster."

The monster was over ten metres tall, with hair like a mop and a nose like a beak.

"Next I want to show the reader how scary he was. Can anyone suggest another sentence using a simile to describe how scary our monster is?" The teacher uses the students' suggestions to write the next sentence.

He had teeth as sharp as razors, and they glinted in the dull light of the cave.

"Now I want to show what the monster sounded like, to give the reader a strong sense of how frightening he is. Who can suggest a simile that describes what a scary monster might sound like?" The teacher uses the students' similes to create the next sentences.

When he spoke, his voice was like a hissing snake. "Get out of my house," he said.

"Now I think the monster would attack the narrator, and try to chase her out of his cave."

Suddenly, he lunged forward and tried to grab me with his hands like claws.

"Let's read over what we've written so far."

The monster was over ten metres tall, with hair like a mop and a nose like a beak. He had teeth as sharp as razors, and they glinted in the dull light of the cave. When he spoke, his voice was like a hissing snake. "Get out of my house," he said. Suddenly, he lunged forward and tried to grab me with his hands like claws.

Next, the teacher asks the class to look back over the story and check the spelling, punctuation and grammar to see if they can spot any errors.

Finally, the teacher asks the students to return to the scary monster they drew in their workbooks and to write a paragraph describing their scary monster, using the three similes they wrote down earlier. At the end of the lesson, he asks them to check their work for correct punctuation such as using capital letters and full stops in the right places, spelling errors, and grammatical accuracy and correct sentence structure.

By breaking the task down into parts – recapping existing knowledge, using modelled writing, and using scaffolded questions to guide the students to think of their own similes, write their own text and then check for spelling, punctuation and grammatical accuracy – the teacher has managed his students' cognitive load.

When have I used this strategy over the last year?

How could I use this strategy in future lessons?

STRATEGY 2
Use worked examples to teach students new content or skills

Students learn new content or skills best when they are given lots of worked examples.

A 'worked example' is a problem that has already been solved for the student, with every step fully explained and clearly shown. Research consistently demonstrates that students who are given lots of worked examples learn new content more effectively than students who are required to solve the same problem themselves.

Why is it effective?

Worked examples are effective because they provide students with fully guided instruction, minimising unnecessary load on students' working memories. Fully guided instruction using worked examples is more effective than unguided problem-solving when teaching students new material, because unguided problem-solving places a heavy burden on working memory. A student left to solve a new type of problem with minimal guidance might solve the problem correctly, but because their working memory was overloaded, they may not remember the process that would allow them to quickly solve the same problem again.

Worked examples manage cognitive load and free up the student's working memory. Rather than being focused solely on finding the correct answer to a problem, students are able to focus instead on the more important knowledge of how to solve the problem. This means that they are more likely to recall how to solve this type of problem when they are faced with it again in the future.

How can I use it in the classroom?

Worked examples will look different in different learning areas. For example, in maths, the teacher might show students several examples of a fully solved algebraic equation. In English, the teacher might model for the students how to write an argumentative essay, by 'thinking aloud' through each step of the process. In food technology, the teacher might demonstrate how to correctly use a piece of food preparation equipment, and explain the correct procedures aloud as he does so.

Many of the strategies described in this publication are ways of ensuring that worked examples are effective. To use worked examples successfully in their classrooms, teachers can:

Target lessons according to students' existing knowledge and skill, by providing lots of worked examples when the material is new, and gradually increasing independent problem-solving as students become more proficient	**SEE STRATEGY 1, 2 & 3**
Cut out inessential information that adds to cognitive load	**SEE STRATEGY 4**
Present all the essential information together to reduce the chances of cognitive overload	**SEE STRATEGY 5**
Make complex information more accessible by using a combination of voice and visuals to describe it	**SEE STRATEGY 6**

STRATEGY 2
Examples for the classroom

Example 1: Year 3 English

A Year 3 class is learning about word contractions. The aim of this lesson is for students to learn that apostrophes can be used to signal missing letters. The teacher decides to create a worksheet for the students to practise identifying where apostrophes should be placed in contracted words.

What does it look like?

The teacher begins by introducing word contractions to the class, and gives some examples by writing two sentences with contracted words on the board.

1. I do not like eggs.
   I don't like eggs.

2. You are not the teacher; he is the teacher.
   You're not the teacher; he's the teacher.

He then gives the students a worksheet with ten sets of sentences. The first sentence in each set is a worked example of how to correctly contract a word. The second sentence is almost identical to the first, but the student must place the apostrophe correctly themselves. For example:

3. She won't like them.
   The boy wont eat carrots.

4. There's a brown cow.
   On Friday theres a football game.

5. That's what I'd have done.
   Id eat her chocolate, but thats wrong.

This manages the cognitive load placed on the students' working memories, and allows their attention to be focussed only on the key features of the problem. By freeing up space in the students' working memories to focus on how to solve the problem, they are more likely to remember the rule that will allow them to correctly identify the contracted form again.

Example 2: Year 10 English

A Year 10 English class is studying Shakespeare's 'A midsummer night's dream'. When planning her lesson, the teacher decides to present her students with an extract from the important first scene of the play. In this scene, many of the major characters and their relationships are introduced, important narrative information is given, and some of the themes of the play are established. The aim of the lesson is for students to interpret the events, situations and characters in the scene, and to analyse the language used to express ideas about love, which is a major theme of the play.

What does it look like?

To make it easier for her students to understand the extract, the teacher decides to use two forms of worked examples. First, she gives the students a worksheet with an excerpt from the play. Under every line of the original Shakespearean text, an explanatory line is provided which simplifies the verse into contemporary English. Students are given time to read the extract themselves and to interpret the action and characters in the scene using the guidance provided by the modern English translation. They are then given a series of scaffolding questions to help them understand how the author has used language to express ideas about love.

Reading Shakespearean text can place a heavy cognitive load on students' working memories, because as well as grasping the action of the scene, they also need to understand the unfamiliar Elizabethan English language, interpret the poetic form and imagery, and recognise the many references to religion and mythology. Providing guidance in the form of worked examples helps to reduce this cognitive burden, making it easier for students to interpret the play and analyse how language is used.

When have I used this strategy over the last year?

How could I use this strategy in future lessons?

STRATEGY 5
Present all the essential information together

Students do not learn effectively when their limited attention is split between two or more sources of essential information that have been separated.

Cognitive overload can occur when students have to split their attention between two or more sources of information that have been presented separately, but can only be understood in reference to each other.

Why is it effective?

Presenting information in a split format means that students have to hold two separate pieces of information in their heads at the same time, and mentally integrate them. This can overload the working memory and inhibit learning. Cognitive overload can be avoided by presenting separate sources of information together.

There are two types of split information, which teachers should avoid:

Split by time

x A maths teacher explains how to solve an algebraic equation but does not show the students an example of the equation until several minutes later.

Split by space

x A biology textbook includes a diagram of the human respiratory system on one page, but does not provide a description of each respiratory organ until the next page.

How can I use it in the classroom?

The table below shows some lesson formats that include multiple sources of information, and gives examples of how they could be changed from a split format to an intergrated format.

Lesson format	Example	Split format	Integrated format
A combination of diagrams and written explanations.	A science lesson on the life cycle of a frog.	Students are given a diagram illustrating the life cycle of a frog, but the written explanations of each stage of the cycle are provided in a separate text box below.	The written descriptions of each stage of the life cycle are incorporated directly into the diagram, as close as possible to the relevant section.
Two or more sources of written information.	A language lesson in which students have to translate a passage of text with unfamiliar words.	Students are given an extract of text written in French, and a French-English dictionary to look up unfamiliar words.	The vocabulary translations are incorporated into the passage itself, directly above each unfamiliar word.
Students read instructions while learning to operate a piece of software or equipment.	A lesson on how to use an Excel spreadsheet to create mathematical formulas within cells.	Students are given a printed set of instructions to follow while they enter the formulas into the cells.	The instructions are incorporated directly into the spreadsheet, with each instruction positioned in the cell adjacent to where the formula needs to be created.

STRATEGY 5
Examples for the classroom

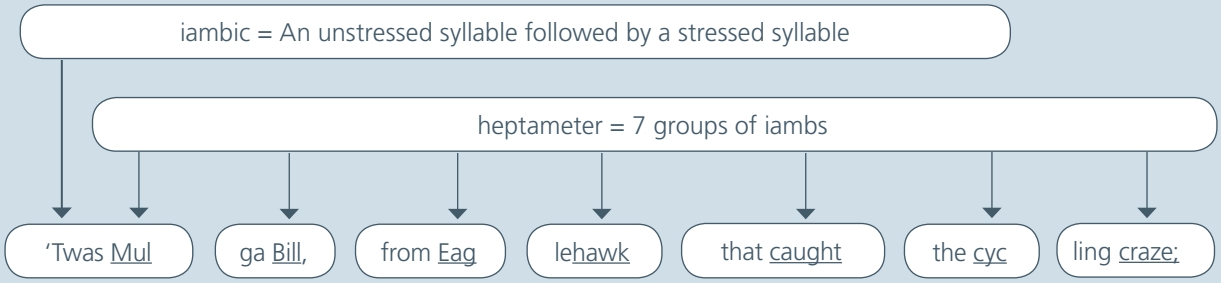
Example 1: Year 7 English

A Year 7 English class is learning about how language is used to create layers of meaning in texts. The aim of this lesson is for students to understand how sound and rhythm are used in poetry. The teacher decides to use "Mulga Bill's Bicycle", by A.B. 'Banjo' Paterson, to teach the students about iambic heptameter. He designs a worksheet to help the students understand the aim of the lesson.

What does it look like?

In this worksheet, a visual demonstration of where the stress is placed on each syllable is positioned directly below each word. The definitions of 'iamb' and 'heptameter' are located within the illustration itself, directly above where each element is located.

Iambic heptameter



He turned | away | the good | old horse | that served | him ma | ny days;
He dressed | himself | in cyc | ling clothes, | resplend | ent to | be seen;
He hurr | ied off | to town | and bought | a shin | ing new | machine;
And as | he wheeled | it through | the door, | with air | of lord | ly pride,
The grin | ning shop | assis | tant said, | 'Excuse | me, can | you ride?'

By physically incorporating the four different sources of information in the worksheet – the definition, diagram, poem and word list definitions – this worksheet manages the cognitive load placed on students. Now that the students' working memories are not overloaded, they have more space available to transfer the knowledge of iambic heptameter into their long-term memories.

Example 2: Year 3 Maths

A Year 3 class is learning to recognise the connection between addition and subtraction. The aim of this lesson is for students to learn how to solve arithmetic word problems. The teacher decides to use a worksheet of worked examples to help her students practise solving this type of problem.

What does it look like?

The teacher provides the students with a worksheet on which a visual representation of how to solve the word problem is presented alongside the statement.

Brian has 8 strawberries. 

Charlie has 2 strawberries more than Brian. 

Maggie has 3 strawberries less than Charlie. 

How many strawberries does Maggie have? **Answer: Maggie has 7 strawberries.**

Because the teacher has already physically integrated the word problem and the solution, the students do not have to integrate the information in their heads. This reduces the burden on their working memories, leaving more mental space available for the important work of transferring this knowledge into their long-term memories.

When have I used this strategy over the last year?

How could I use this strategy in future lessons?

STRATEGY 6
Simplify complex information by presenting it both orally and visually

Students can process complex information more easily when it is presented in both oral and visual forms at the same time.

When there are two or more sources of information that can only be understood in reference to each other, cognitive load can be managed by presenting information both orally and visually. This strategy increases the capacity of students' working memories, creating more mental space for learning.

Why is it effective?

Our working memories have two separate 'channels' – one for dealing with visual information, and another for dealing with auditory information. By spreading the delivery of information across both of these channels at once, teachers can manage cognitive load and make it easier for students to learn the information. This can be done by communicating information using both images and sound. For example, the teacher could show students a diagram, and explain it orally at the same time.

How can I use it in the classroom?

Combining oral and visual information is particularly effective for teaching content that is very complicated and difficult to understand. Students' working memories can easily be overloaded by trying to process a lot of new information that is only presented visually, such as a combination of written descriptions and diagrams. Teachers can manage students' cognitive load in situations like this by communicating some of that information verbally – such as by removing the written descriptions from the diagrams, and reading the descriptions out loud instead.

It is important to remember that this strategy only applies to essential information. Information that is not essential to the lesson should be removed.

At first glance, Strategy 6, "Simplify complex information by presenting it both orally and visually", might seem to contradict Strategy 5, "Present all the essential information together". Actually, both of these two strategies work to reduce cognitive load, just in different ways. By presenting separate sources of information in one place, cognitive load is reduced by **decreasing** the total amount of information that students have to process. By communicating complex information both orally and visually, the capacity of students' working memories is **increased** so that they can process more information. See "Which strategy should I choose to optimise my students' cognitive load?", page 4.

The strategy of combining oral and visual information is particularly effective for teaching students very well-defined material, such as technical procedures or mathematical processes. The strategy is not known to be as effective in areas that are less well-defined, such as the creative arts.

For this strategy to be effective, teachers should:

1. **Break down spoken explanations into short, simple statements.**

   Using long, complex sentences in spoken language places large demands on working memory because the student has to retain lots of information in order to understand each sentence. This does not leave much capacity for absorbing new information.

2. **Use visual cues to indicate which section of a diagram they refer to.**

   This could be done simply by pointing to the relevant section of the diagram. This is important because, if students have to listen to a verbal description while also searching for the relevant section of the diagram, they are likely to experience cognitive overload.

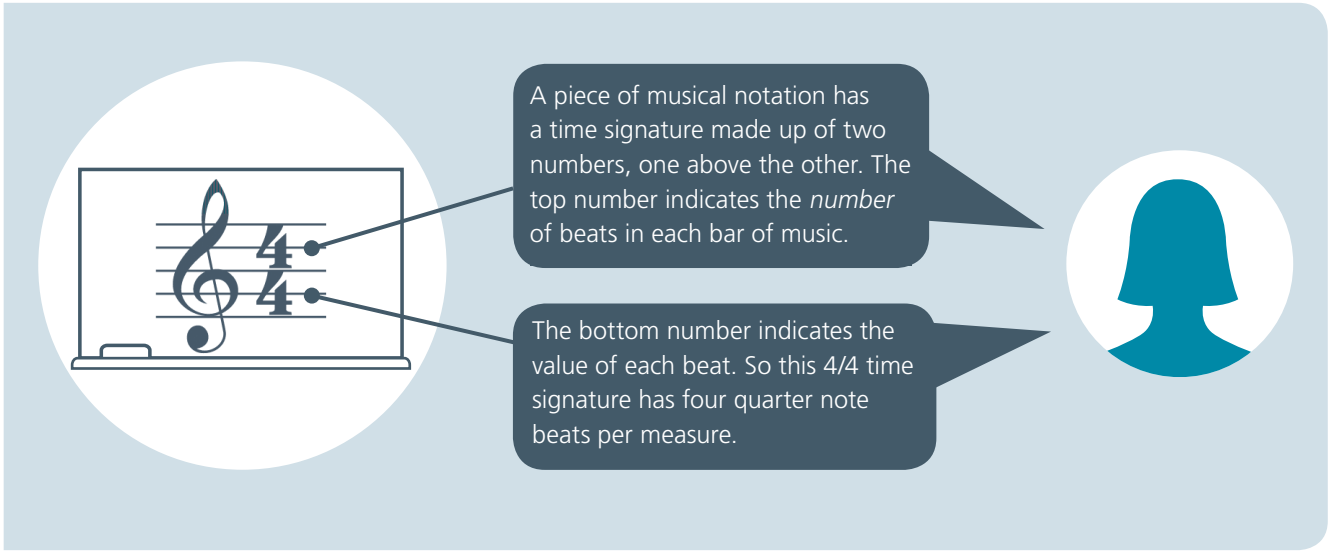
STRATEGY 6
Examples for the classroom

Example 1: Year 7 Music

A Year 7 music class is learning how to read musical notation. The aim of this lesson is for students to understand time signatures. The teacher knows that this lesson involves two separate sources of information that can only be understood in reference to each other – the time signature, and the description of how to understand it. This will create a heavy cognitive load for her students. She has two options to reduce this load. She could present the two sources of information visually as text and a diagram, and make sure they are physically integrated (Strategy 5, page 21). Or, she could present the two sources of information using both auditory and visual channels of communication. She decides to use the second approach.

What does it look like?

The teachers shows the students a PowerPoint slide with a time signature and explains that the time signature indicates the meter of the piece of music. While the students look at the slide, she verbally describes the steps required to read the time signature, pointing to the relevant section of the time signature as she describes each step.



By presenting the two sources of information both orally and visually, the teacher has created more mental 'space' for the students in which to learn the skill of reading time signatures. By also pointing out each section of the diagram that she is referring to, she has saved the students from having to search for each relevant section themselves. Now their working memories are freed up to learn the skill of reading time signatures.

Example 2: Year 6 Science

A Year 6 class is learning how electrical energy can be transferred and transformed in electrical circuits. The aim of this lesson is for students to understand how coal can generate electricity. The teacher knows that to explain this process, she will need to use both text and a diagram. This is likely to place a heavy burden on the students' working memories, so the teacher decides to manage their cognitive load by presenting the information both orally and visually.

What does it look like?

The teacher creates a PowerPoint slide with a flow chart showing five stages of electricity generation. While the students look at the slide, the teacher explains each of the five stages of the process. She keeps her descriptions of each stage short and easy to understand.

By using a combination of oral and visual communication, the teacher has managed the cognitive load of her students. By also keeping the verbal descriptions short, the teacher has ensured that the strategy will be effective.

When have I used this strategy over the last year?

How could I use this strategy in future lessons?

STRATEGY 7

Encourage students to visualise concepts and procedures that they have learnt

Students understand and recall information better when they visualise the things they have learnt.

Encouraging students to visualise what they have learnt helps them to better understand and recall the information. Once students have a good grasp of the content, the mental process of visualising helps students to store the information more effectively in their long-term memories. This strategy should only be used once students are familiar with the content, as visualising imposes quite a heavy cognitive load.

Why is it effective?

The process of visualising means mentally reproducing a procedure or concept. For example, a student learning how to solve a geometry problem might visualise each of the steps required to reach the solution. When students have to visualise something they have learnt, they are required to retrieve information held in their long-term memory and process it in their working memory. This mental process helps students to engage with information more deeply, and to begin to recall it automatically without much conscious effort.

How can I use it in the classroom?

Recalling something takes up a lot of mental resources, so these strategies will only be effective if there is enough mental space available in the working memory. For this reason, visualising concepts is a very useful practice once students have a good grasp of the content, but should not be used for students who are new to the material.

Encouraging students to visualise concepts is a way of adapting teaching strategies to suit more proficient learners. In this way, the strategy is similar to the approaches of omitting steps from a worked example or gradually giving students fewer worked examples. This strategy is often more effective than 'fading out' guidance, because it avoids providing redundant information.


LESSON 1
LIFE CYCLE
Activity 1 : Add or Subtract
Name
Fill in the missing sign (+/-)

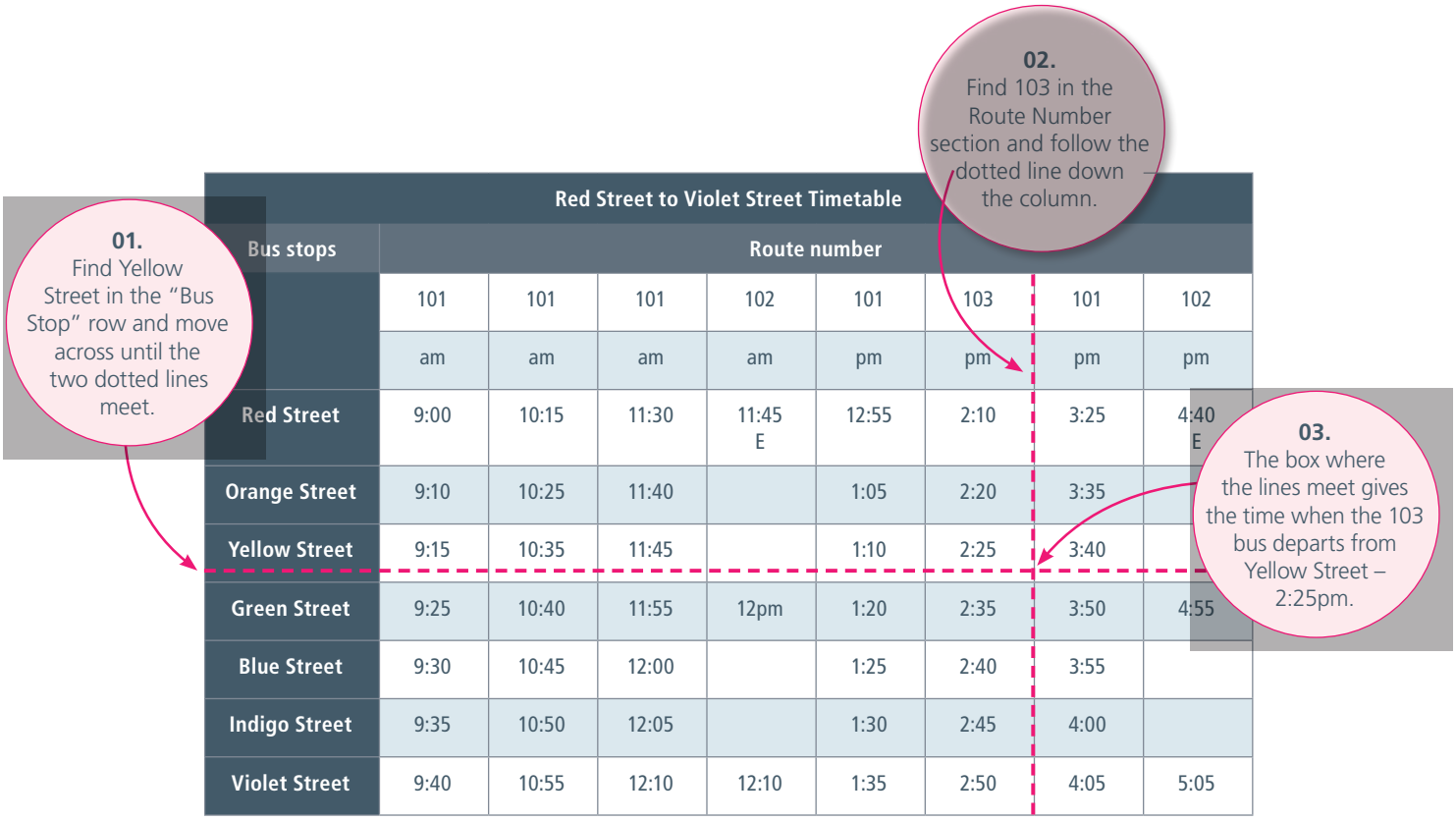
STRATEGY 7
Examples for the classroom

Example 1: Year 4 Maths

A Year 4 class is learning to read and interpret simple timetables. The students have been using bus timetables to practise this skill. They have already learnt the procedure for reading a bus timetable using lots of worked examples. The aim of this lesson is for students to learn how to read bus timetables automatically without having to think consciously about each of the steps involved.

What does it look like?

The teacher decides to encourage his students to visualise the process of reading a bus timetable. The teacher begins the lesson by showing his students one worked example of how to read a bus timetable.



Red Street to Violet Street Timetable

Bus stops	Route number							
	101	101	101	102	101	103	101	102
	am	am	am	am	pm	pm	pm	pm
Red Street	9:00	10:15	11:30	11:45 E	12:55	2:10	3:25	4:40 E
Orange Street	9:10	10:25	11:40		1:05	2:20	3:35	
Yellow Street	9:15	10:35	11:45		1:10	2:25	3:40	
Green Street	9:25	10:40	11:55	12pm	1:20	2:35	3:50	4:55
Blue Street	9:30	10:45	12:00		1:25	2:40	3:55	
Indigo Street	9:35	10:50	12:05		1:30	2:45	4:00	
Violet Street	9:40	10:55	12:10	12:10	1:35	2:50	4:05	5:05

He then tells the students to read instruction number one on the worked example, and when they are sure they understand it, to turn over the sheet of paper and to visualise following the instruction they have just read. He tells the students to continue this process for the second and third instructions, until they have visualised following all of the instructions.

By encouraging his students to visualise the process of reading a bus timetable, the teacher has helped them to build stronger schemas for this knowledge in their long-term memories. Lots of practice like this will help the students to automatically retrieve this knowledge from their long-term memories without much conscious effort.

Example 2: Year 6 Personal Development, Health and Physical Education

A Year 6 Personal Development, Health and Physical Education (PDHPE) class is learning to apply the movement skills needed in cricket. The aim of this lesson is to practice the correct cricket batting stance and grip. The students have already been studying diagrams and videos demonstrating the correct stance and grip, and have been practising this in pairs. The teacher has noticed that sometimes the students forget the correct stance, and hold the bat the wrong way. To help the students build stronger schemas for the information in their long-term memories so that they can recall it automatically, the teacher decides to have the students visualise the correct stance and grip.

What does it look like?

The teacher asks the students to sit with their eyes closed, and visualise themselves standing at the pitch. She asks them to picture how their feet are placed, using the correct stance they have already learnt. She then asks them to visualise themselves holding the bat, using the correct grip that they have been studying. Finally, she asks them to picture a cricket ball coming towards them, and to visualise using the technique they have learnt to hit the ball correctly. She encourages the students to imagine this sequence several times more, before returning to practice their stance and grip again in pairs.

Encouraging the students to visualise the correct stance and grip forces the students to access this information in their long-term memory and process it in their working memory. This type of practice requires a lot of mental effort, but it will help the students to automatically retrieve this information during games of cricket, with minimal conscious effort.

When have I used this strategy over the last year?

How could I use this strategy in future lessons?

Author: CESE
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Centre for Education Statistics and Evaluation
GPO Box 33, Sydney NSW 2001, Australia

Visit our website to subscribe to the CESE newsletter

7814 1399
info@cese.nsw.gov.au
cese.nsw.gov.au
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