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CHOKING EFFECT, LEARNING SCHOOL PERFORMANCE. WHAT ROLE DO EMOTIONAL AND MOTIVATIONAL PROCESSES PLAY?*

Introduction: In recent decades, the relationship between motivation and learning has attracted interest and attention among researchers with many studies examining the variables that characterize and influence them and their relationship.

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Research Aim: The aim of this review is to analyze the role of motivation in learning as well as useful strategies to increase motivation to study.

Evidence-based Facts: This narrative review is based on a detailed analysis of the data collected from the empirical studies on the topic. The main theories on motivation to learn such as the theory of attribution and socio-cognitive theory that are centered on self-efficacy, expectation of results, and self-regulation are described and discussed focusing on the expectation of success and the value of the task. Particular importance has been given to the detection of learning motivation in relation to the “choking effect” as an important motivational construct in learning outcomes, being related to personality variables, emotional intelligence, and academic success. Finally, the strategic indicators for improving academic success are discussed.

Summary: This review highlights the importance of motivation to learn a task, that is associated with personality, emotional control, and emotional intelligence that helps the individual in determining useful study strategies which can lead to greater academic success.

Keywords: motivation, learning, “choking effect”, academic success.

INTRODUCTION

Motivation as a fundamental notion in psychology, meaning and defined as movement towards an object or a person identified as an incentive to act and structured subjective experiences that direct the intensity and persistence of a purpose-directed behavior, respectively (Moè, 2010) is undoubtedly an essential component in learning. Motivation is considered an essential component in performance in almost all domains and based on a general common sense and research findings, motivation and the willingness to invest effort in an activity generally increase dependent on the potential consequent rewards of that specific activity (Rigoli and Pezzulo, 2022).

Motivation involves an interplay between an objective (e.g. completing a relatively time consuming homework), an obstacle to that objective (e.g. the difficulty of the subject itself), and a force required to deal with that objective (e.g. taking time away from other more “enjoyable” activities and allocating it to the new goal at hand) (Shenhav et al., 2021). Considering the example above which is a cognitively demanding tasks, the force that is needed to deal with the objective is cognitive control, which helps us to process information in a flexible manner and attend to some aspects of the environment while ignoring others (Botvinick and Cohen, 2014). Major theories on learning motivation have examined different aspects of motivation for working toward a specified goal and the associated outcomes (Orbach et al., 2019). There are still inconsistencies in our knowledge about how exactly motivational factors lead to real-life performance.

There are investigations showing that motivation to invest physical (Yoon et al., 2018) and mental effort (Shenhav et al., 2021) increases when one is expecting more reward. However, in real-life conditions, these concrete rewards do not seem

to be enough to predict how people really act and what the results would be since, it seems that it is extremely difficult to maintain a high level of motivation for a long period of time to learn something complicated, although the outcome reward can be much higher at the end of the learning process (Rigoli and Pezzulo, 2022).

EVIDENCE-BASED REVIEW

Contemporary theories on learning motivation

The expectation-value theory formulated by Wigfield and Eccles (2000) is based on two fundamental concepts: expectation of success, referring to the self-estimation of success when an individual tries to carry out a task, and value of the task, referring to the importance that the individual gives to the execution of that task, based on their abilities and their previous personal experiences.

Regarding the value of the task, four important factors for learning are usually considered:

- individual's interest in the subject of the task,
- usefulness of topics or skills that are learned by the individual and that can be advantageous in carrying out future tasks,
- importance on a personal level, which depends on the skills that are acquired following the successful performance of the task at hand,
- opportunity cost of committing oneself to a single task while leaving out others.

The attribution theory formulated by Weiner (1985) focuses on three fundamental key concepts: locus of control, when the causes are internal or external to the subject; stability, when they are stable over time, and controllability, when they can be controlled by the subject. Attributions vary in terms of these three characteristics. In addition, Weiner has classified several emotions that may depend on attribution or the direct result of success or failure. Depending on the causal dimensions, pride and self-esteem are associated with locus, greater gratitude or greater shame with stability, and anger, gratitude, sense of guilt, pity, and shame with controllability.

In the socio-cognitive theory of Bandura (1986), learning and individual performance occur through the reciprocal influence of three factors: personal, being the thoughts and feelings that motivate the individual to learn, behavioral being the actions performed by the individual, and environmental, which are in relation to the context in which they find themselves. Some important concepts on which the socio-cognitive theory is based are: self-efficacy, expectation of results, and self-regulation.

Self-efficacy refers to an individual's opinion of their ability to successfully complete a task which is considered important because it motivates the individu-



al to take an action, and consequently, to adopt appropriate behaviors to achieve their goals. The possibility of reaching the set objectives depends on the beliefs that the individual has about his or her abilities, interests, and values. Self-efficacy is strengthened by success and positive emotions, while it is negatively affected by failures and negative emotions. This arises from the way in which the individual interprets the results both on the basis of their own past experiences and on the basis of the results obtained by other individuals through the observation of their behaviors (Pajares, 2008; Bandura, 1997).

Expectation of results refers to the opinion that the individual has about the anticipation of reaching certain results following specific behaviors (Schunk and Zimmerman, 2006) and self-regulation, refers to the individual's ability to develop a method in order to manage their own emotional and behavioral components. Although the beliefs of self-efficacy and expectation of outcome are two different concepts, both have an impact on motivation and for this reason they are considered necessary to reach and maintain an optimal level of motivation (Schunk and Zimmerman, 2006).

Deci and Ryan's (1985) theory of self-determination focuses on three psychological innate needs: the needs for competence, autonomy, and relationship with others. The need for competence leads the person to improve their own attitudes and seek new incentives and occurs when the subject recognizes his own value in the social context. Autonomy is present when an individual's action depends on their own will and not on that of the others. While the need to relate to others allows the person to feel satisfaction from being an integral part of the society, one must take into account the positive or negative influence of the environmental context in which they find themselves.

The role of motivation in the learning process has been examined in different studies. In particular, researchers have looked at the performance of children, adolescents and adults during certain tasks to understand how motivation can affect learning based on positive and negative feedback. Feedback-based learning, both positive and negative, has been shown to vary with age. The changing reactivity to feedback actually depends on the development of the individual, level of maturity, and recruitment of various brain areas related to cognitive control. Interestingly, it has been found that it is important to consider the motivational level induced by the reward in learning from negative feedback, since excessive motivation can have a detrimental effect on the learning process. It seems like the reduction of learning from negative feedback happens when subjects choose the option that is considered riskier and is associated with a greater probability of gain/loss which is shown in both children and adults, but mainly in adolescents (Zhuang et al., 2017). Actually, the data regarding adolescents suggests excessive activity in the area of the brain associated with risky choices: the nucleus accumbens (Ernst et al., 2005; Galvan et al., 2006).



Reward-induced excessive motivation can also cause detrimental effects on task performance, since it is possible that a high reward can decrease performance, leading to a phenomenon known as the “choking effect” (Chib et al., 2012, 2014). Neuroscientific studies have hypothesized that this phenomenon may be due to unbalanced activation in subcortical areas, associated with reward processing and in the prefrontal cortex, associated with cognitive control (Aarts et al., 2014). In this regard, several researchers have deduced that this is more common in adolescents since they are still in the phase of development in which reward and cognitive control circuits show this imbalances to some extent (Hagmann et al., 2010; Mills et al., 2014; Baker et al., 2015). Furthermore, it has been shown that the choking effect is mediated by dopamine and that excessive motivation could cause an increase in dopamine dosage levels in reward circuits in those who already have a high capacity of synthesizing dopamine, thus, compromising their cognitive control (Cools and D’Esposito, 2011).

The role of curiosity

One of the major exponents focusing on curiosity is Berlyne (1954), who described different types of curiosity: perceptive, epistemic, specific, and diversionary. Berlyne argues that perceptual curiosity is a motivational drive for which individuals seek new stimuli. Epistemic curiosity is considered a drive whereby individuals tend to seek and obtain information in order to satisfy their desire to learn and broaden their knowledge. Specific curiosity is the individual’s desire to search for a certain type of information, while diversionary curiosity is defined as the individual’s desire to seek information to avoid boredom. Generally, the search for information is associated with both an intrinsic and extrinsic motivational drive, while curiosity is only associated with intrinsic drive. A recent perspective considers curiosity as a particular form of information seeking (Loewenstein, 1994; Oudeyer and Kaplan, 2007).

Kidd and Hayden (2015) in their study tried to explain curiosity through the use of the four questions proposed by Tinbergen (1963) to explain the causes of any behavior, thus making a clearer vision of the function, evolution, mechanisms, and development of curiosity. Specifically, the authors hypothesized that the main function of curiosity is to motivate learning and lead the individual to focus more on finding new information to acquire new knowledge. As far as the evolution of curiosity is concerned, the search for information pushes the individual to make choices that are motivated by the desire for temporal resolution of what is still unknown up to that moment. Actually, the acquisition of information is considered as an evolutionary trait of the individual that brings benefits and, consequently, makes it possible to hypothesize that curiosity leads to better performance.

In a study by Kang et al. (2009), the latter claimed that curiosity improves learning and took up Lowenstein’s (1994) information gap theory. In this theory,



curiosity is the cognitive lack that is triggered by the impression of a knowledge gap and that small amounts of information are needed to trigger it. As information increases, curiosity increases, until it fills the knowledge gap and, consequently, curiosity decreases until it is completely satisfied. Using functional magnetic resonance (fMRI) while carrying out the task, it was observed that the areas most involved are: the caudate nucleus, the inferior frontal gyrus, the parahippocampal gyrus and the hippocampus. In particular, the activity in the caudate nucleus and in the inferior frontal gyrus indicates that curiosity can anticipate a state of reward; while the activation of the parahippocampal gyrus and hippocampus, areas associated with learning and memory, indicates that learning is greater when the hypotheses of the subjects are found to be wrong once the answers are revealed after finishing the task. Activation of these areas has been surprising since the investigators expected other structures that are usually associated with reward such as the nucleus accumbens, to be involved (Knutson et al., 2001).

In a subsequent study by Jepma et al. (2012), the cerebral areas activated by curiosity in addition to the parahippocampal gyrus and the hippocampus were reported to be the anterior cingulate cortex, anterior insula, and the striatal circuits.

In this study, curiosity is examined by evaluating responses to photographs of unknown faces and it was found that in trials where curiosity was high, subjects remembered the faces more compared to trials where curiosity was low. As a result, it has been inferred that curiosity enhances learning. As for the brain areas most involved are: the midbrain, the nucleus accumbens, and the hippocampus. The activation of these areas has allowed the investigators to hypothesize that curiosity, despite being considered as a typically intrinsic motivational construct, has the same mechanisms associated with the rewards of extrinsic motivation. Altogether, based on the results obtained in previous studies and from the observation of the involved areas, it is possible to argue that curiosity plays a relevant role in the learning process.

Cognitive and learning styles

Cognitive and learning styles have attracted particular attention as it has been hypothesized that students' abilities may partly explain their mode of achieving outcomes and that learning can consequently happen in an optimal fashion. This demonstrates a positive relationship among motivational, cognitive, and emotional variables (Allwright, 1984; Battistelli et al., 2009; Cadamuro et al., 2011).

In the model proposed by Miller (1987), there are sub-processes within perception, memory, and thought processes that correspond to different cognitive styles, namely analytical/global, systematic/intuitive, impulsive/reflexive, verbal/visual, convergent/divergent, and dependent field/independent field. In particular, during the learning process, individuals with an analytic style perform a task starting from observing details to arrive at an overall vision. Conversely, those

who have a global style initially choose to have an overall vision and then focus on the details. Individuals who adopt a systematic style check the formulation of hypotheses by considering various factors from time to time, while those who adopt an intuitive style immediately reach conclusions following the formulation of hypotheses which are corroborated or denied. During the decision-making process, individuals with an impulsive style give hasty responses, thus, spending less time to reach decisions which can sometimes be suboptimal, while individuals with a reflective style prefer to plan all the various phases by spending more time and, consequently, come up with more precise answers. Individuals who adopt a verbal style memorize better through the use of language via summarizing and repeating, while those who adopt a visual style prefer visuo-spatial perception, using schemes, tables, or diagrams.

One of the best known models of learning styles is that of Kolb (1984). According to this model, the learning process consists of four phases which are repeated cyclically. The first is the concrete experiences phase, in which individuals are oriented to learn from perceptions and responses deriving from experiences. They have an intuitive method and prefer to relate to others and are willing to face unexpected circumstances and open up to new ideas. Reflective observation is the second phase, in which individuals are oriented to learn through listening and observation, seeking the meaning of the circumstances and considering them from different points of view. The third is the phase of abstract conceptualization, in which thoughts, use of logic, and ideas are important to facilitate learning. Individuals have the ability to organize and analyze problems clearly and rigorously through the use of a theoretical and systematic as opposed to a practical approach.

Active experimentation is the fourth phase, in which learning depends on the action and observation of the results. For this reason, individuals recruiting this strategy prefer practical activities to theoretical ones to achieve their goals and are motivated by the learning that derives from the obtained results. From different combinations deriving from these four phases, four different learning styles have been identified: convergent, divergent, assimilator, and accommodator.

Several studies have been carried out which examined learning styles of students. In particular, some researchers conducted a study on a sample of students of Medicine and Surgery of the University of Messina, using the Kolb's Learning Style Inventory-2 (1985) to investigate the correlation between learning styles and the way in which students approach medicine and their orientation towards career choices. This study reconfirmed Kolb's bipolar dimensions, according to which the four scales (concrete experiences, reflective observation, abstract conceptualization, and active experimentation) are combined in abstract conceptualization / concrete experiences and active experimentation / reflective observation. Furthermore, it has been observed that based on the first combination of abstract conceptualization / concrete experiences, students manifest a change not only in-

ward, but also in the way they learn through experiences. However, in the second combination active experimentation / reflective observation, students manifest the ability to face situations regarding their own characteristics and what they consider important. The study proved important as the researchers inferred that concrete experiences are useful for surgical practice, abstract conceptualization for research, reflective observation for psychiatric practice, and active experimentation for laboratory studies. This implies that, when the four skills are implemented by the student and one prevails over others, the talent can manifest itself and, consequently, the student is able to choose a professional path more accurately (Mento et al., 2017).

Another study to examine cognitive and learning styles. The approach relating to cognitive styles revealed the preference for learning style and metacognition. The questionnaire relating to learning styles revealed that the preferences of students in a decreasing order are: accommodating, assimilating, divergent, and convergent. Examining the correlation between cognitive styles and the four stages of learning revealed that individuals with the oligarchic, conservative, executive, analytical, and internal cognitive styles scored higher in relation to the four stages of learning. In particular, the researchers found a positive correlation between both the phases of concrete experiences and active experimentation with the oligarchic cognitive style, the phase of reflective observation with the conservative, executive and analytical cognitive styles, and the phase of abstract conceptualization with the internal cognitive style (Table 1).

Table 1.

Correlation between the main cognitive styles and learning phases

Stages of learning	Concrete experiences	Reflective observation	Abstract conceptualization	Active experimentation
Cognitive styles	oligarchic	conservative	internal	oligarchic
		executive		
		analytical		

Source: Authors' own study.

The results revealed that the learning styles have a statistically different trend if related to some of the main cognitive styles. In particular, it was observed that students with an oligarchic cognitive style adopt learning styles in the following descending order: accommodating, convergent, divergent and assimilating. Furthermore, the same statistical trend was observed both in students who adopt a conservative cognitive style and in those who adopt an executive cognitive style (Cadamuro et al., 2006). The learning styles and the following descending order in divergent, assimilator, convergent, and accommodating (see Table 2).

Table 2.
Correlation between the main cognitive styles and learning styles

Cognitive styles	Oligarchic	Conservative	Executive	Analytical
Learning styles	accommodator	divergent	divergent	divergent
	convergent	assimilator	assimilator	assimilator
	divergent	convergent	convergent	accommodator
	assimilator	accommodator	accommodator	convergent

Source: Authors' own study.

Emotions

Pekrun (2014) proposed that learning can be influenced by emotions and investigated the relationship between emotions and learning in adolescent students, based on the idea that emotions can regulate attention, learning motivation, choice of strategies, and self-regulation. Epistemic emotions emerge especially when new tasks are presented and the student may experience amazement, curiosity, pleasure, disorientation, or dejection.

Social emotions refer to the admiration, compassion, anger, shame, empathy, contempt, or envy that can arise between peers within the same class or between students and teachers. Topic-oriented emotions can be positive or negative and are important as they attract the student's interest in the topic. Finally, the emotions related to success do not only refer to the possible success, but also in the event of a possible failure. Emotions can be roughly divided into positive (e.g. hope, pleasure, or enthusiasm) or negative, both of which can lead to changes in physiological and cognitive effects. Furthermore, attention, motivation, use of learning strategies, and self-regulation of learning are influenced by positive emotions. If the attention is paid to a task, positive emotions that one feels later can be considered to be related to the task itself, as happens in a student who feels the enthusiasm for the topics to be learned or feels pleasure in learning itself. On the other hand, if the attention is not directed to the task, but to other situations that can be considered pleasant for the person, the emotions that the person feels can influence the performance in a negative way. A specific example of the this could be a student who enjoys the thought of spending time with others rather than focusing on the homework.

Motivation can undergo variations even when one feels less of positive emotions. An example of this is when a student who takes pleasure in relaxation feels less motivated to continue engaging in the ongoing activity, while an example of motivation that is increased by the deactivation of positive emotions is when a student, in the same situation, feels more motivated to resume the activity at a later time.

Negative emotions can be triggered by anger, shame, and anxiety, while they are suppressed by boredom or despair. As with positive emotions, attention, motivation, use of learning strategies, and self-regulation of learning in students are

influenced by negative emotions. Attention can be reduced by negative emotions, compromising one's learning performance and success.

Oriented regulation refers to the use of strategies that regulate physiological processes and attention related to emotion, such as, for example, the student can use relaxation techniques to reduce anxiety or divert their attention from the emotion not to stay focused on it anymore and, therefore, consciously reject it. Evaluation-oriented regulation refers to the way in which the individual modifies the evaluation leading to the emotion. Examples include assessing self-confidence, as the learner views their abilities positively which can affect the emotion they feel.

Competence-oriented regulation refers to the way in which the individual increases their abilities, reducing negative emotions by increasing the positive ones that can derive from a successful result. An example of this adjustment could be a student expanding their skills to reduce anxiety by increasing the pleasure of learning in order to pass the exam.

Situation-oriented regulation refers to the way in which the individual chooses or changes the environmental context in which they find themselves in, to modify their emotions. Some examples of this regulation can be those in which a student, who is free to modify the learning environment and tasks, can choose a school that is appropriate to their needs or choose tasks that induce pleasure in learning over those that induce anxiety or boredom. When students have a good ability to recognize their emotions, they are able to choose suitable strategies to regulate them. These two capacities constitute the concept of emotional intelligence which is an important concept because once one's own emotions and also those of others are recognized they can be used, and modulated in an effective manner (Gross, 1998; Matthews et al., 2002; Thompson et al., 2009; Trigueros et al., 2019; Wirawan et al., 2019).

Role of emotional intelligence

Emotional intelligence is defined as a set of fundamental emotional skills that allow individuals to adapt thoughts and behaviors based on the interpretation of their own emotional states and those of others. Therefore, the adaptation of thoughts and behaviors produce effects that are influenced by four emotional abilities that characterize the construct of emotional intelligence: recognizing one's own emotional states and those of others, using emotions to guide thought and behavior, understanding how emotions affect behavior and the regulation of emotions (Hoogeveen et al., 2016).

Damage in the following brain areas: anterior insula, anterior cingulate cortex, and ventromedial prefrontal cortex is associated with deficits in the recognition of one's own emotional states and those of others. In particular, a study was carried out by Raymont et al. (2011) on a sample of Vietnam war veterans with head trauma and the results showed that subjects with damage in the anterior insula have difficulty expressing their emotions to others and therefore have a condition

called alexithymia, characterized by a reduction of emotional awareness, or in the recognition of one's own emotional states (Sifneos, 1973).

The other brain areas involved in emotional awareness are the anterior cingulate cortex and the ventromedial prefrontal cortex. The study by Cohen et al. (2001) reported that following removal of the supracallosal sectors of the anterior cingulate cortex, subjects show a decrease in tension and anger. Individuals with ventromedial prefrontal cortex injuries, on the other hand, showed a reduction in regret after making decisions that led to unfavorable outcomes. It is hypothesized, based on these evidence, that the ventromedial prefrontal cortex is involved in learning and reward processes, because it is believed that it is not only able to calculate the value that is attributed to the reward, but also the value attributed to one's own experiences (Camille et al., 2004, 2011). Furthermore, individuals with injuries to this brain area show apathy and impulsivity and are unable to experience a proper social adaptation (Grabenhorst and Rolls, 2011; Hogeveen et al., 2017).

Regarding the recognition of the emotions of others, amygdala and the somatosensory cortex have also been reported to be involved in emotional awareness. For example, individuals with amygdala lesions show an inability to recognize emotions that are manifested through the facial expressions of others (Adolphs et al., 1994; Brierley et al., 2004).

The second emotional skill is about using emotions to shape and guide thinking and behavior. In particular, emotions can influence affective empathy and emotional memory. Considering that affective empathy can be defined as the ability of an individual to perceive the same emotions felt by others, this can thus influence the behavior of the person.

The third emotional skill consists of understanding how emotions affect the behavior of the individual and that of others. In this regard, the theory of mind is considered important which refers to the ability of an individual to be able to assign mental states to others in order to understand how thoughts and behaviors are influenced by emotions. Evidence from several studies point to the ventromedial prefrontal cortex as an important region concerning this and that individuals with injuries in this area have difficulties with the theory of mind (Leopold et al., 2012; Shamay-Tsoory et al., 2005).

Finally, the fourth skill concerns emotion regulation, that is, the way in which the individual modulates responses to emotions. This favors psychosocial well-being, but psychopathologies such as anxiety, depression, or aggressive behavior can occur when individuals have a deficit in the regulation of emotions (Sheppes et al., 2015). Several studies suggest that the brain areas involved in the regulation of emotions are the ventromedial prefrontal cortex, the ventrolateral prefrontal cortex and the amygdala (Angrilli et al., 1996; Falquez et al., 2014). Individuals with lesions in these areas exhibit dysfunctional emotion regulation (Grafman et al., 1986, 1996).



Strategies to increase motivation

Dörnyei (2001) has identified and described various conditions for motivational strategies to be successful: initially an ideal condition is needed to generate motivation in students, then it is necessary to identify useful strategies to increase and maintain it over time. The author argues that in the school setting, the use of motivational strategies can facilitate student learning and it is important to consider some aspects concerning the material to be learned, values, expectation of success, beliefs, goals, and cooperation between students. As for the expectation of success, this assumes a significant role if associated with positive values as students, if they believe they can be successful, they carry out their tasks with more enthusiasm and commitment. Some examples can be: receiving help from teachers to deal with difficulties encountered in the homework, collaborating with peers, having adequate preparation, having a clear understanding of the criteria to achieve success, planning solutions for any difficulties during the learning process, and observing how other students have successfully approached the same activity to taking them as role models. Another strategy for increasing motivation is to investigate students' beliefs meaning that they are helped to create beliefs that correspond to reality and the strategies that are put in place are to face any wrong beliefs or expectation in a positive way, to increase their awareness of the real progress they can expect of themselves. It is essential that students create a united group and this can have positive effects, such as achieving results in a shorter time and making the learning process more enjoyable. In fact, one of the most important strategies for increasing motivation is to foster cooperation between students.

In addition to defining these motivational strategies that promote learning, Dörnyei (2001) also argues that certain factors such as self-esteem, self-confidence and autonomy can influence the growth and development of the individual. Actually, in the event that individuals have low self-esteem and self-confidence and do not believe they are capable enough as students, they have a reduced motivation which must be promoted by strengthening self-esteem and self-confidence.

Since the use of motivational strategies allows you to adapt your behaviors in order to reach the set goals, many researchers have focused on observing the behavior based on healthy lifestyles, such as following a balanced diet, carrying out regular physical activity, learning how to manage stress, good quality and quantity of sleep, avoiding drug abuse, relying on social support and using the Internet in a constructive and moderate way (Bodai et al., 2018; Dalle Grave and Mangeri, 2012).

According to Stea and Torstveit (2014), there is a relationship between behaviors of individuals based on healthy lifestyles and school performance, as it has been found that students with unhealthy lifestyles show a negative influence on cognitive function, i.e. reduced attention and memory and, consequently, this leads to failure in school.

Maniaci et al. (2021) investigated the relationship between the effects of students' lifestyles and their academic performance in 373 adolescents (Table 3). Regarding school performance, it is evident that positive relationships were associated with good nutrition, perceived social support by students, and self-esteem, while negative relationships were associated with poor nutrition, excessive use of the internet, and perceived stress by students. Regarding the amount of hours of sleep, there are evident positive relationships associated with perceived social support and self-esteem and negative relationships associated with perceived stress, excessive use of the internet, and poor nutrition.

Table 3.

Relationships between lifestyles and school performance highlighted in the study by Maniaci et al. (2021)

	Positive correlations	Negative correlations
School performance	<ul style="list-style-type: none"> • Good nutrition • Perceived social support • Self-esteem 	<ul style="list-style-type: none"> • Bad nutrition • Excessive use of the Internet • Perceived stress
Number of hours of sleep	<ul style="list-style-type: none"> • Perceived social support • Self-esteem 	<ul style="list-style-type: none"> • Perceived stress • Excessive use of the Internet • Bad nutrition
Healthy nutrition	<ul style="list-style-type: none"> • Self-esteem 	<ul style="list-style-type: none"> • Bad nutrition • Excessive use of the Internet
Bad nutrition	<ul style="list-style-type: none"> • Perceived stress • Excessive use of the Internet 	<ul style="list-style-type: none"> • Amount of hours of sleep
Perceived social support	<ul style="list-style-type: none"> • Self-esteem 	<ul style="list-style-type: none"> • Excessive use of the Internet
Perceived stress	<ul style="list-style-type: none"> • Excessive use of the Internet 	<ul style="list-style-type: none"> • Self-esteem
Self-esteem	<ul style="list-style-type: none"> • Healthy nutrition • Perceived social support 	<ul style="list-style-type: none"> • Excessive use of the Internet
Excessive use of the Internet	<ul style="list-style-type: none"> • Bad nutrition • Perceived stress 	<ul style="list-style-type: none"> • Amount of hours of sleep

Source: Authors' own study.

SUMMARY

In recent years, an important phenomenon known as the “choking effect” (Chib et al., 2012, 2014) has received attention, which is detrimental to task performance. This phenomenon occurs when reward-induced excessive motivation is present. Many researchers have outlined that the cause of this phenomenon can be traced to unbalanced activation in the subcortical as well as in the prefrontal regions of the brain (Aarts et al., 2014) and the increase of dopamine in the reward circuits

(Cools and D'Esposito, 2011). Others, however, have examined the neural mechanisms associated with curiosity and identified that the brain areas mostly involved are the caudate nucleus, the inferior frontal gyrus, the parahippocampal gyrus, the hippocampus (Kang et al., 2009), the parahippocampal gyrus, anterior cingulate cortex, the anterior insula, striatal circuits (Jepma et al., 2012), the midbrain, and the nucleus accumbens (Gruber et al., 2014). Therefore, based on these results and the observation of the areas most involved during the performance of the tasks, it was possible to argue that curiosity plays a relevant role in the learning process.

CONCLUSIONS

In conclusion, the strategies used to increase and maintain motivation positively affect learning and also influence the growth and development of the individual. In particular, the increase in motivation that favors learning takes place using learning material inherent to the interests, hobbies, and lifestyles of the student, increasing the chances of success by associating them with positive values, creating beliefs that correspond to reality, establishing specific objectives, and promoting cooperation between students. While the increase in motivation that influences the growth and development of the individual occurs when the latter has high self-confidence, high self-esteem, and a good level of autonomy. Involvement in activities that make learning enjoyable can also maintain student motivation over time.

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EFEKT ZACHŁYŚNIĘCIA SIĘ, NAUKA WYDAJNOŚCI W SZKOLE. JAKĄ ROLĘ ODGRYWAJĄ PROCESY EMOCJONALNE I MOTYWACYJNE?

Wprowadzenie: W ostatnich dziesięcioleciach zainteresowanie i uwagę badaczy zwrócił związek między motywacją a uczeniem się oraz inne zmienne charakteryzujące te procesy i wpływające na nie.

Cel badań: Celem zaproponowanego przeglądu literatury jest analiza roli motywacji w uczeniu się oraz przydatnych strategii zwiększania motywacji do nauki.

Stan wiedzy: Przedstawiony przegląd narracyjny opiera się na szczegółowej analizie danych zebranych z badań empirycznych na ten temat. Opisano i omówiono główne teorie dotyczące motywacji do uczenia się, takie jak teoria atrybucji i teoria społeczno-poznawcza, które kon-



centrują się na poczuciu własnej skuteczności, oczekiwaniu wyników i samoregulacji, skupiając się na oczekiwaniu sukcesu i wartości płynących z zadania. Szczególną wagę poświęcono wykryciu motywacji do nauki w odniesieniu do efektu zachłyśnięcia jako ważnego konstruktu motywacyjnego w wynikach uczenia się, który jest powiązany ze zmiennymi osobowościowymi, inteligencją emocjonalną i sukcesami w nauce. Na zakończenie omówiono strategiczne wskaźniki poprawy sukcesu akademickiego.

Podsumowanie: Praca podkreśla znaczenie motywacji do nauki, która jest związana z osobowością, kontrolą emocjonalną i inteligencją emocjonalną, co pomaga jednostce w określeniu przydatnych strategii uczenia się, które z kolei mogą prowadzić do większych sukcesów w nauce.

Słowa kluczowe: motywacja, uczenie się, efekt zachłyśnięcia, sukces akademicki.



