

ON PUZZLING TEENAGE LEARNERS' BEHAVIOR: BRAIN DEVELOPMENT, NEEDS, AND USEFUL STRATEGIES TO IMPROVE THEIR MOTIVATION AND ENGAGEMENT

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Abstract

World Health Organization (WHO) defines adolescence as a stage of life between 10 to 19 years old, "a unique stage of human development" (Adolescent Health, 2023). While some language teachers or instructors are very keen on teaching learners in this age group, others find working with teenage learners not an easy task and yet challenging (Harmer, 2007 as cited by de Gentile & de Orue, 2012). For most teenagers, hanging out with their peers is more exciting than being and working in class. "They also generally find it rather difficult to postpone what they find more fun and usually have to make an effort not to fall asleep" (de Gentile & de Orue, 2012). The root of these puzzling teenage behaviors may lie in the maturing development of the teenage brain. Through library study, this paper discusses the brain development teenage learners undergo, their needs following this condition, and some useful classroom strategies to accommodate those needs and to improve their motivation and engagement in English class.

Keywords: activities, brain development, English learning, motivation and engagement, teenage learners

Introduction

World Health Organization (WHO) defines adolescence as a unique stage of human development between 10 to 19 years old when a dramatic transformation occurs (Adolescent Health, 2023). Although the age span to define adolescence varies in different cultures, the term adolescence is closely related to "a psycho-social-biological stage of development that corresponds to changes in many areas" (Offer, 2013) accompanying the transition from childhood to adulthood. Rapid changes in adolescents' physical condition, cognitive growth, and social interaction that they experience affect their feelings, thoughts, decision-making process, and the way they see their surroundings. This period is often characterized as a turmoil or "extremes of psychological functioning" when "the adolescent might feel happy and altruistic one day and depressed and egocentric the next." (Offer, 2013). The adolescence period has shown an increase in risk-taking behavior, "impulsivity, emotional turmoil" (Watanabe, 2017), and sensation-seeking behavior compared to adults. Even though the advantages do

not necessarily outweigh the disadvantages, teenagers are more receptive to the influence of their peers and the media.

It seems like a mystery at first to understand why teenagers think and act the way they do. Early attempts to characterize adolescents' behavior "focused on the hormonal changes that emerge" (Galvan, 2013) in this period. However, Galvan (2013) found that "adolescent behavior is more than just a product of 'raging hormones'. Instead, pubertal hormones influence and interact with functional brain development". The changes in hormones and brain combined play a significant role in teenage behaviors such as reward-seeking behavior. Recent research in neuroscience highlights the findings that it may lie in the remarkable maturing brain that teenagers undergo "both in structure and function" (Romeo and McEwen, 2006 as cited by de Gentile & de Orue, 2012). The teenage brain is undergoing a significant and dramatic transition.

While some English teachers might dedicate their teaching career to working with this special age group, working with teenagers is not a simple task. The brain maturation process teenage learners undergo and its effects are manifested in the classroom. Teachers may have noticed the emotional turmoil, the roller coaster of teenage learners' engagement with their surroundings. On the one hand, teenage learners are more receptive to their peers' influence. On the other hand, they find it difficult to initiate interaction with their peers, especially those who are from different genders or whom they do not know well. Despite seeking social interaction, teenage learners tend to work with their closest classmates only, making it challenging for teachers to motivate them to collaborate with others. de Gentile and de Orue in their article entitled *Getting Teens to Really Work* (2012) even illustrated that "some teenage students talk non-stop and are usually not that enthusiastic about the activities planned for a lesson. What is worse is that even if students do cooperate, they can stay focused only if they manage not to fall asleep!".

Method

Since teaching English to teenagers is challenging, it requires flexible and resourceful teachers reinforced by the knowledge about teenage brain development. Hence, this paper will explore some of the brain changes learners experience during adolescence, recognize teenage-specific needs following the brain maturation process that might become teachers' challenges in class, and describe some useful classroom strategies in learning English to accommodate those needs and to improve their motivation and engagement in English class. Through library research, a study conducted which involves a collection of books, journals, and online articles, this paper aims to descriptively discuss the nature of brain development teenage learners undergo which can explain their puzzling behavior, their specific needs, and some classroom strategies to help them succeed in learning English. This paper does not differentiate the individual disparity such as gender and personality traits in discussing the brain development of teenagers, nor do hormonal changes and puberty.

Findings and Discussion

The structure and function of the brain change remarkably during adolescence. A great deal number of research and experiments have tried to figure

out what is happening during the brain maturation process and the implications. It is not once puzzling teenage behavior results in an unsuccessful English learning process and teachers are struggling in developing appropriate lessons and activities.

Several changes during the brain maturing process

In an article published by the US Department of Health and Human Services, it is found that the teenage brain stops growing in size during adolescence, but the process of fine-tuning, refining, and polishing how it works happens in this period. The brain "reaches 95 percent of its full size by age 6" (de Gentile & de Orue, 2012). By approximately the age of 12, a teenager's brain has reached the size and weight of an adult's brain (Powell, 2006). Luna et al. (2013) mentioned that the basic architecture of the teenage brain remained stable. The development of brain functioning continues throughout adolescence until a person is 25 years old.

During adolescence, melatonin levels stay high until later at night and drop later in the morning. Melatonin is a hormone produced in the brain that regulates the sleep-wake cycle and circadian rhythms in humans by controlling the timing of when someone sleeps and wakes up. Melatonin levels normally rise in the evening, signaling the body to prepare to sleep, and decrease in the morning, allowing one to wake up and become alert. However, melatonin levels in teenagers stay high until late at night and drop later than they are in adults, answering why teenagers may stay up late and struggle with waking up early. Consequently, they do not get enough sleep, making it harder to pay attention in class and do well at school (de Gentile & de Orue, 2012).

The prefrontal cortex, the part of the human brain behind the forehead that is crucial in planning, prioritizing, and decision-making is one of the last parts to mature, yet matures most rapidly during adolescence (de Gentile & de Orue, 2012; National Institute of Mental Health, 2023). Connections that were directed by the prefrontal cortex are strengthened from childhood to adolescence which support subsequent refinements in neural connectivity during the transition to adulthood. In adolescents, this stage of brain development leads teens to focus more on peer relationships, novelty, sensation (Luna et al., 2013), and social experiences than the possible consequences of a decision. Teens' brain considers that social benefits outweigh the risks. Besides, because their brain is still developing, teens may respond to stress differently than adults, resulting in higher chances of developing stress-related conditions such as anxiety or depression, including in their classes. They seek experiences and novelty including in their classroom environment but they may be prone to stress.

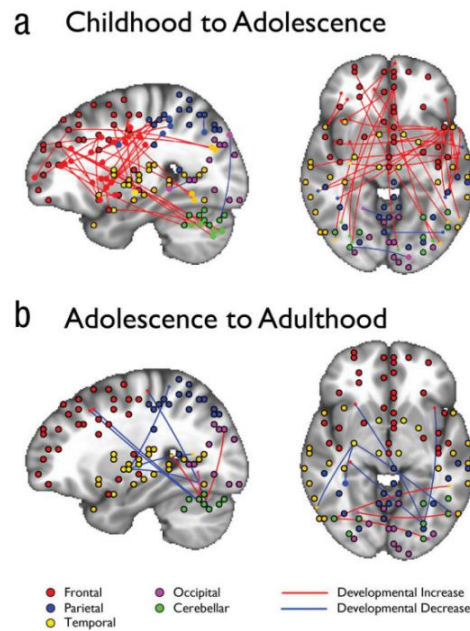


Figure 1. The brain connectivity is established between childhood and adolescence compared to adulthood (Luna et al., 2013)

Furthermore, converging evidence in human development studies indicates that adolescence is characterized by “a peak in the availability and function of dopamine..., which suggests that this is a period of heightened reward sensitivity” (Rosenberg & Lewis, 1994; Spear, 2000; Wahlstrom, White, & Luciana, 2010 as cited by Luna et al., 2013) which is parallel to sensation seeking behavior mentioned earlier. Steinberg et al. (2009) as mentioned by Galvan (2013) also highlight that there is a peak in reward and sensation-seeking behavior when teens are around 12 to 15 years old and 17 to 18 years old. In classroom situations, teenage learners might be more motivated when there is a reward awaits.

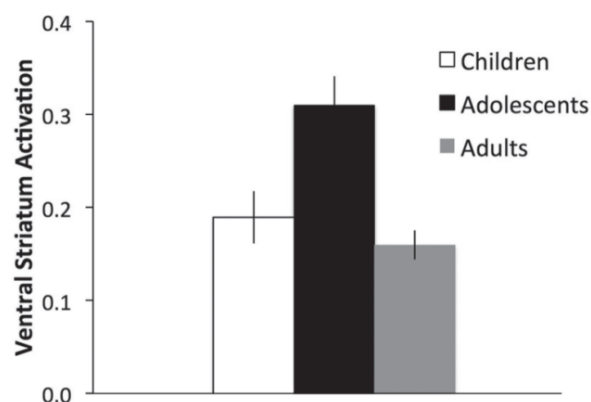


Figure 2. Brain activity in the ventral striatum during reward processing in children, adolescents, and adults (Galván et al., 2006 as shown by Galvan, 2013)

What is also worth considering in teenage brain development is the process called synaptic pruning. During childhood, “the brain grows excessive numbers of connectors between brain cells. For the brain to mature, it needs to get rid of

unnecessary connections and stabilize the ones that are left” (de Gentile & de Orue, 2012). When teenagers are 11 or 12 years old, they begin to lose a significant number of connections based on the use it or leave it principle, which means brain connections that are used will be kept and flourish, the ones that are not will be naturally eliminated due to overproduced synapses (Whitford et al., 2007).

The distinctive needs of teenage learners

With so many brain activities and maturing processes going on during adolescence which affect the way teenagers think, feel, and act manifested in the classroom, the challenges of teaching them are not too great to overcome. Teaching teenagers can be more manageable if teachers understand the causes of teens’ puzzling behavior and the needs that follow the brain refinement process. By recognizing the specific needs teenagers have, teachers can design pedagogical activities to deal with teenage learners and establish a more meaningful learning environment. de Gentile and de Orue (2012) illustrated several teenage learners’ needs concerning the brain maturation process. The needs discussed further apply to most EFL learners. However, they are more common in teens.

a. The need to play and interact socially

Teenagers enjoy their peers’ companionship since social interaction during the period of adolescence is a critical for successful brain-maturing process. Klein, Padow, and Romeo (2010) as cited by de Gentile and de Orue (2012) even highlight that social isolation during adolescence can result in “dysfunctional behavior during adulthood”. Hence, a language learning classroom environment that involves a lot of social interaction supports learning more than the one with little interaction. Teachers should design a more useful component of language practice and more room for authentic communication in class such as through collaborative and interactive group work to promote students’ engagement while still accommodating their need to interact with their peers. Incorporating games in the language learning environment, especially group/team games, is not only fun and stimulates interaction, but it is also associated with the need to play, a characteristic of the transition from childhood to adolescence.

b. The need to rest

In the previous section, it has been discussed how the melatonin level of adolescents is activated longer than the one of adults affecting the sleep-wake cycle. To put it simply, it is often difficult for teenagers to wake up early and remain alert during the day due to sleep deprivation as a result of melatonin activity in their brains. “Teachers may notice students being half-awake in the early part of the school day” (Coleman, 2021). It brings another challenge for teachers as they should consider planning stimulating activities to help them focus if teenage learners are sleepy in class.

c. The need to do physical activity

Incorporating short activities involving movements “leads to increased concentration, which helps keep teenagers more attentive during the whole class period” (de Gentile & de Orue, 2012). Having teenage learners move around

during the learning process through a purposeful kinesthetic learning activity such as coming to the front of the room, standing up, or changing seats, can promote the release of endorphins and dopamine to help them stay focused and motivated. The Centers for Disease Control and Prevention (2010) even “found positive associations between classroom-based physical activity and indicators of cognitive skills and attitudes, academic behavior, and academic achievement.”

d. The need to learn in a stress-reduced environment

The adolescence period is a significant time when the brain experiences “a major process of maturation. It becomes more efficient, and a variety of new skills and abilities develop.” (Coleman, 2021). Since this is a period when a major change occurs and considering that teenagers are more prone to stress, “the environment around the young person is especially important” (Coleman, 2021). The teenage brain responds to stressful conditions differently from adults and develops stress-related conditions more easily. In addition, they are exposed to high levels of stress at school. Marder (2007) even advised that the effects of “chronic stress during adolescence” and genetic factors on the maturing, developing brain can have serious consequences. The stress hormone, cortisol, “damages and kills brain cells” (de Gentile & de Orue, 2012). Thus, teenage learners demand to learn in a stress-reduced environment which means “key adults, such as teachers, have a big role to play in assisting healthy brain development” (Coleman, 2021). Teachers can accommodate this need and lower teenage students’ stress levels by giving them choices, such as texts to read or a list of activities to do first, to allow them to take responsibility and have a sense of control or belonging over their learning process.

Suggested activities for teenagers in English learning classroom

Having known that the teenage brain is activated in those ways during its fine-tuning process of functions and structure, and having understood how the process is manifested in the needs in a classroom extent, teachers can deal with their puzzling behavior by designing appropriate lessons and activities. An essential factor to intellectual growth is movement or physical activity, and encouraging social environment. Levine (2014) as cited by McCaughey (2018) even mentions that “the human brain is designed to think while moving”. Discussed below are the sample activities that incorporate physical movement, social interaction, game/gamification, and collaboration to accommodate teenage reward-seeking behavior and stress-reduced classroom environment.

Activity 1: Hand It In!

The goal of this activity is to provide vocabulary or grammar practice involving physical movement to keep teenage learners engaged and motivated. This can also be used to review a wide range of topics such as paraphrased versions of statements in reading passages. Teachers need to divide the class into small teams and prepare one envelope per team containing vocabulary cards using different colors for each team’s cards to help teachers determine which team provided the greatest number of correct answers. Conducted indoors or outdoors, the procedures are explained as follows:

1. In a small team, the students stand at the back of the classroom.
2. Each team is given an envelope containing a set of cards with words or answers needed to the questions that the teacher will show on the board or will read. For example, if the class learned about prepositions, then the sample question would be “*My sister is really good _____ golf. She has won several championships.*”
3. Each member of the team collaborates in deciding the correct word needed among their cards. The student who has the word that correctly completes the sentence runs to the teacher and hands it in.
4. The teacher keeps the card of the team members that arrives first with the right answers. The game continues by reading or showing the next question.

Activity 2: Find Someone Who...

This activity is inspired by teachthis.com entry and can be fun to use during circle time or to get to know others better by asking and collecting information about students’ classmates which takes around 30 minutes to practice. The teacher needs to prepare a handout/ a worksheet containing a table with three columns; the list of information students have to find, names, and information. For example:

Table 1. Sample of Find someone who topic

Find someone who	Name	Information
has the same hobby as yours		
has brothers or sisters		
eats breakfast every morning		

Alternatively, instead of preparing the same set of questions, teachers can prepare different sets of questions (type A, B, C, for instance), so that there will be more varied information gained. The teacher can ask the students to walk around the classroom and find information about their classmates, or assign around 10-15 minutes to collect the information. Upon finishing asking for information, students read their findings and share the most interesting info about their classmates in class. It can promote more purposeful interaction among teenage learners and their peers.

Activity 3: Jigsaw Reading

By allocating 45 to 60 minutes of the meeting and preparing handouts containing different reading passages and highlighters or pencils through jigsaw reading activity, the teacher can create a less stressful learning environment where students can have more control over their choices. The activity aims at enhancing cooperative learning and interaction. If the class reads about pollution, students can be divided into small groups and each group is provided with a different section about various types of pollution from the article or depending on the topic discussed in class. For example, one group will focus on water pollution; the second group will take charge of air pollution, etc...Each group should carefully go over their sections. The teacher should help his/her students learn how to take

notes while reading. Each member of the group should orally share what they learned from the text (causes, effects, and suggested solutions).

This helps enhance reading and speaking skills as well as active participation. Teenage learners can also practice being more responsible with their choices. At the end of the class, the teacher can encourage his students to reflect on what they learned and express their opinions about the topic learned through this jigsaw reading activity.

Activity 4: One Host, Three Guests

This activity incorporates differentiated learning and collaborative learning which is effective to make everyone in class work in different roles. It can take from 45-60 minutes for the whole meeting to do the activity. Students should work in groups of 4. The teacher needs to prepare the topics for the discussion, some large blank paper for students' creation, stationery, and a reflection sheet. Alternatively, the students can prepare a poster as a mini-project.

The topics discussed can be about the problem-solution of some issues. The teacher can prepare a few topics to choose from and after forming the groups, the students can choose the most interesting topic for them. They can be assigned for different roles such as the note taker/moderator, the problem/cause finder, the solution finder, and the artist. After around 15 minutes of discussing the topic chosen, the students can create graphic organizers, a mind map, an infographic, or a drawing representing the discussion results. Teaching the vocabulary and useful phrases or discussing some issues in class together can be done if necessary.

After the students finish creating their products, the teacher can ask them to choose a new role; one member of the group should stay to receive some guests from other groups and present the results of the group's discussion as A HOST. Other members should go and visit other groups as GUESTS. Bringing the peer-assessment sheets, each guest should focus on different things; for example the language feature, the creation, and the content, and ask questions related to their products. After visiting all groups, the guests can go back to their group and report their findings to the host where they can decide on the most interesting presentation, the most comprehensive content, the widest range of language features, and the most interesting question/ most attentive guest (from the host). All groups will share the group's decision and what they learn from other groups.

Activity 5: Board Games or Bamboozle with Rewards



Figure 3. Sample of a board game taken from *Activate: Games for learning American English: Teachers' Manual* (2013)

In the period when the brain activates more if a reward is present, playing games that enable teenage students to receive points or rewards is undoubtedly motivating. One of the examples is through board games in which teenage learners can obtain higher points if they can provide more complex and accurate responses based on the grammar points discussed. Using online games such as Bamboozle can be an interesting alternative if the teacher wants to involve technology.

Conclusion

Teaching a foreign language to teenagers is a special challenge considering their brain development which affects their behaviors. This condition indicates several teenage essential needs in the classroom context namely the need for play and social interaction, the need to rest, the need to be active physically, and the need to study in a stress-reduced environment. Although the brain size has reached its maximum size, the development intensifies through some fine-tuning processes both in the neural connection and function. The reason why teenage learners experience sleep deprivation which makes it hard to stay focused in class lies in the high melatonin level during the night. Although it develops rapidly, the prefrontal cortex which is crucial for prioritizing, planning, and decision-making is the last part to mature. Consequently, teenage learners show a typical behavior of seeking sensation and reward.

English teachers play a big role in meeting the needs of teenage learners. English teachers should be resourceful and understand that teenagers are still

developing both physically and mentally. Therefore, tailoring teaching strategies can help address the specific needs of teenage learners to enhance their motivation and engagement in the classroom. Teachers can use authentic materials such as news articles or TV series episodes with subtitles to help improve reading and listening skills. Playing vocabulary or grammar games can help teenagers retain information while also being a fun activity to fulfill their needs for rewards and movement in a stress-free classroom environment. Besides, teachers can incorporate technology by having the students use language learning apps or interact with online resources for English language learning.

However, it is worth considering and recommended for further research on the effect of gadget exposure and the COVID-19 pandemic on the teenage brain. During the pandemic, students were imprisoned at home for around two years with minimum exposure to social interaction and physical activities. Their sleeping habits might have changed and they might have experienced different kinds of stress in their learning processes. Instead, teenagers are exposed to gadgets a lot during this period and after. Will these affect their brain development and needs? As de Gentile and de Orue (2012) stated “We hope that the suggestions made in this article will increase teachers’ repertoire of resources to help them deal successfully with this especially challenging, but certainly lovable, age group”.

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