



The Development of Emotion and Motivation Throughout Childhood: Cross-Cultural Considerations and Implications for Educational Practices

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Abstract

The ability to identify emotions and motivate oneself to learn are vital life skills with large-scale educational implications. This review paper covers existing cross-cultural studies on emotional detection for both visual and auditory cues as well as motivational studies. The culmination of these studies has found a clear in-group advantage when identifying both auditory and visual emotional cues; although, a difference in developmental time is identified. A biological perspective is assessed as negative emotions are more accurately identified and the ideas of a collectivist versus an individualist culture are explored as it is seen to impact both emotion and motivation. The educational implications of such findings are expressed, and the need for more cross-cultural work is strongly communicated.

Introduction

From aspiring to secure an Ivy League education to immigrating in pursuit of a better educational future for your children, the significance of education resonates globally. It stands as an essential pillar in life, fostering ongoing growth and development. Emotion and motivation are two topics strongly connected to educational attainment. Anderman and Wolters (2006), two researchers whose work focuses on motivation claim that a student's motivation drives their effort to learn and drives their thoughts and actions to obtain academic success. Being able to identify others' emotions as well as one's own emotions is a key part of development and necessary for social situations, such as attending school (Karani, 2021).

While this is all true, many external factors can impact a person's motivation and ability to identify and display emotions. Perhaps the most important external factor is culture. Although many believe that education and intelligence are dependent on genetics, culture has a large impact on one's development. Understanding the impact of some of these factors can help educators better adapt their classrooms to maximize learning. The American Psychological Association (n.d.) defines culture as "the distinctive customs, values, beliefs, knowledge, art, and language of a society or a community". Despite educational implications having an impact on children around the world, very few studies have focused on cross-cultural work. Henrich and colleagues (2010) coined the acronym WEIRD, which stands for western, educated, industrialized, rich, and democratic, to highlight the lack of diversity in research participants in the field of psychology. Specifically in mental cognitive neuroscience research, White/European American participants were studied 4x more than their counterparts (Qu, 2021). No hypotheses can be developed or inferences drawn if the entirety or majority of the data is based on a set group of people. Though much more cross-cultural research needs to be conducted, this paper highlights existing work in the field. Emotional recognition and motivation during development are considered from a cross-cultural perspective, and the educational implications and directions for future research are also explored.

Emotion

Whether it is being scolded by a parent, feeling a rush of excitement before entering a concert, or experiencing a wave of fear wash over you at the sight of a clown, emotions are a driving force in our lives. According to the American Psychological Association (2023), emotions are “a complex reaction pattern, involving experiential, behavioral, and physiological elements, by which an individual attempts to deal with a personally significant matter or event”. Though experiencing emotion is universal, the specific ways in which individuals interpret and express emotions vary across cultures. This section considers cross-cultural differences in the processing of visual and auditory stimuli as well as the expression of emotions.

To understand emotional processing, it is essential to examine it first from a neurological perspective. Located in the medial temporal lobe, the amygdala is one of the most important parts of the brain involved in emotion, specifically with the processing of social cues, emotional conditioning, and emotional memories. As explained by Salzman (2023), the amygdala works alongside the hippocampus and the prefrontal cortex. It directly detects threats at an unconscious level and regulates both behavioral and physiological responses. It also indirectly influences the emergence of conscious feelings of fear through cognitive systems. When damaged, specifically in the presence of a lesion, the processing of facial expressions is impaired, and fear conditioning is disabled. According to Yassa (2023), the hippocampus, located in the medial region of the temporal lobe, is primarily associated with memory. While there are various sections of the hippocampus, the anterior hippocampus is what will be focused on as it is connected to the amygdala and related to emotions and stress. As stated by Arnsten (2010), the prefrontal cortex acts as a gateway to higher-order cognitive abilities, regulating thoughts, emotions, and actions through connections throughout the body. It is the ventromedial prefrontal cortex that generates and regulates emotions in relation to the amygdala.

The growth of these brain regions facilitates the maturation of emotional and cognitive capabilities. During infancy, a child is drawn to visual attention and has a preference to look at things that bring about feelings of happiness. At around one to one-half years old, a child is able to tell from facial expressions whether or not expectations have been met. At two years old, there is physical proof that a child is avoidant of emotionally unpleasant situations, and at three years old, pride and shame become apparent. An especially important hallmark to mention happens a little after a child turns four when they begin to adopt social norms. This is when culture starts to play a part in emotional processing. A social norm is a socially determined standard that indicates behaviors that are considered typical in a certain context. Each culture has its own values, mannerisms, and history, therefore creating its own social norm.

One study focused on auditory processing by Chronaki and colleagues (2018) found that infants are able to perceive and discriminate vocal expressions. By five months, an infant is able to identify vocal changes from sadness to happiness. Studies have shown that certain environmental factors greatly impact this development some of which include parental abuse and culture (Pollack et al., 2008).

Seminal work by Paul Ekman (1907s) suggests that all humans have six basic emotions: sadness, happiness, fear, anger, surprise, and disgust; however, recent research has shown that socio-cultural rules and norms may have an effect on the identification of such emotions. Altarriba (2003) qualifies this idea by stating “There is an inherent challenge in trying to discover whether or not the representation of emotions can be qualified as "universal". They

acknowledge the nuances of the situation such as the fact that the words that describe emotions are more often not specific to each language.

In the same study as previously mentioned by Chronaki and colleagues, 57 monolingual children and 23 monolingual adults listened to various emotional ‘pseudo-utterances’. These audios were produced by native speakers of four different languages: English, Spanish, Chinese, and Arabic depicting various emotions including anger, happiness, sadness, fear, and neutrality. The study's findings showed that the difference in accuracy between children and adolescents is minor while the jump in accuracy from adolescence to adulthood is quite significant. When listening to an audio of a native language, accuracy was almost doubled showing an in-group advantage. This same in-group advantage was also seen in a study conducted by Petri Laukka (2021). In this paper, 37 cross-cultural expression studies were used with over 4,000 participants. It was also found that for expressions harder to recognize, an in-group advantage was more easily identifiable.

Among both cross-cultural and native languages, negative emotions were identified more accurately than positive emotions. Looking at this from an evolutionary perspective may provide some insight. In a study conducted by Laukka (2021), it is hypothesized that this may be the case due to biological (or innate) reactions to threats that negative emotions may convey. This is opposed to positive emotions which are more influenced by culture and other social cues. In another study conducted by Chronaki, which is previously referenced, happiness, sadness, anger, and fear are ranked as the following in order as most accurately identified to least: fear, anger, sadness, and happiness. The top 3 more accurately identified emotions in some aspects are related to our innate reaction to protect ourselves from harm, in other words, they are more negative emotions. Previous research indicates that more positive emotions are better conveyed through visual cues, while negative emotions are more poorly conveyed through visual cues, more on this later.

The Expression of Emotion in Man and Animals was published in 1872 by Charles Darwin. This first sparked the conversation of nature versus nurture behind facial expressions and emotions. Emphasizing cross-cultural studies will aid in gaining clarity on the issue. Looking at early childhood development is one way to observe whether or not visually identifying emotions is innate, or if external factors such as culture play a larger role. A child's ability to accurately identify an emotion based on visual cues is developed with age. A study conducted by Chronaki and colleagues (2015), found that preschoolers were the least accurate in identifying emotion. This capability, however, is seen in infancy. This same study found that at four months, children are able to differentiate positive and negative facial emotions, and have even been seen to have a preference for positive facial emotions. At one year old, children are able to “adjust their social behavior to the emotional message conveyed by facial expressions”. At 7 months old, infants are able to recognize a connection between vocal and facial emotions. By age 11, most children were able to determine emotions based on facial expressions at the same level as most adults. This is in comparison to vocal emotion recognition which continues to develop until late childhood.

Although many of the auditory studies found that Paul Ekman's six basic emotions may not be universal, many of the visual studies have found these six emotions universal. A study conducted by Sauter and colleagues (2009) emphasized the importance of looking at this from a biological perspective. They stated that the fundamental facial muscles responsible for creating the facial expressions linked to basic emotions remain consistent among people. This implies that particular facial muscle formations have probably evolved to enable individuals to generate

universally acknowledged emotional displays. This idea is similarly seen in an early study conducted in the 1970s. A study conducted by Ekman and colleagues (1972) focused on participants in New Guinea who were isolated from any Western influence. Participants were presented with 3 cards at a time each with a picture depicting a different emotion. They were then told a story with a central emotion and asked which card best represents the emotion in the story. Through the strong accuracy of the participants, it was found that emotional perception, at least in a visual sense, is innate to some degree.

A study in the 1990s found that there was a higher accuracy rating for unpleasant moods rather than pleasant moods; however, research conducted more recently has disproven this information. For instance, a study has found that in the age group of 4 to 16-year-olds, sadness, and anger were the least accurately identified in comparison to other emotions, happiness being one of them (Montirosso et al., 2010). Another study conducted by Gao and Maurer (2009) found that the rate of correctly identifying sad faces showed slower improvement with age; however, this was in comparison to fear and disgust, both of which would be considered unpleasant or negative emotions. Altarriba and colleagues (2003), discovered that anger and disgust had a higher level of ethnic and cultural influence. This may explain why negative emotions are more inaccurately identified in studies and why even within certain cultures, improvement is slower with age.

Similarly seen in auditory stimuli, there is an apparent ingroup bias. In a study conducted by Altarriba and colleagues (2003), African-American and White participants demonstrated a higher accuracy when looking at pictures of people from their own race. An interesting finding is seen with regard to Latinos and Asians. It was found that both groups were able to recognize not only expressions from people of their own race but also the faces of white participants. This is in comparison to recognizing African American faces. Another study conducted by Tanaka and colleagues (2004), found that white participants most accurately identified emotions of faces of their own race while Asians were able to accurately identify both own-race faces and other-race faces. In both studies, the explanation simply came down to the amount of exposure each person has to their own race as well as others.

Referring back to the section on the parts of the brain, a study led by Moriguchi and colleagues (2005) revealed variations in how the brain processes fearful facial expressions among Caucasian and Japanese participants, indicating increased activity in the left amygdala of Caucasians. The topic of in-group accuracy comes up once again as another study conducted by Chiao and colleagues (2008) observed a significant elevation in the response of the amygdala to an in-group expression of fear. This applied to both Caucasian and Japanese participants. Familiarity with one's own ethnicity and culture does seem to have a clear role in processing and identifying emotions. While it is only a specific component of visually displaying emotions, Adams and colleagues (2010) studied the effect of direct versus averted eye gaze in the context of processing fear in students. Participants showed heightened amygdala activation when members of their "in-group" looked away compared to looking directly at them, suggesting an increased emotional response linked to caution during averted gaze. However, when individuals from an "out-group" looked directly at participants, the amygdala exhibited stronger activation, possibly indicating an intensified emotional reaction tied to perceived threat or unfamiliarity. This again goes back to looking at this from a biological standpoint.

The topics of in-group bias, positive and negative emotions, and Paul Ekman's theory of six basic emotions were covered for both auditory and visual emotion studies. These studies found how connected and independent auditory and visual emotion recognition are from each

other. In the process of better understanding the cross-cultural implications, studies on empathy and emotional depiction.

Similarly to what was previously discussed, while looking at empathy it is relevant to consider an in-group bias or advantage. A study by Chiao and Mathur (2010) found that the neural response is heightened in those witnessing the pain or discomfort of someone of the same ingroup, in this case, ethnicity. Cheon and colleagues (2011) state that heightening in response is an “empathetic neural reactivity”. This same reaction has been observed in similar cases of emotional pain.

The differences between individualistic cultures and collectivist cultures may be stark, but so too are its impacts and implications. Cheon and colleagues (2011) found that the left dorsolateral prefrontal cortex mediates enhanced emotion regulation during empathy with anger in a collectivist culture. As for individualistic cultures, the researchers found an increased tolerance to anger which was seen in an increase in activity of the right inferior, the superior temporal gyrus, and the left middle insula.

Greck and colleagues (2007) similarly focused on comparing individualistic cultures with collectivist cultures and focused their studies specifically on American and Japanese children. Using a cartoon, they found a heightened response in a part of the brain called the temporoparietal junction in American children. Upon further research, they found that the diminished activity in Japanese children may relate to a lesser level of self-other distinction. In a general summary of their findings, the researchers expressed how collectivist cultures typically had reduced neural activation in areas associated with comprehending social motives when intentionally empathizing with expressions of anger.

Motivation

Motivation and the study of motivation hold an important position in life as it serves as a cornerstone in understanding human behavior and one's driving forces. While the American Psychological Association (n.d.) defines it as “the impetus that gives purpose or direction to behavior and operates in humans at a conscious or unconscious level”, the implications and importance that it holds in our life are not expressed in the definition. Rooted deep within the anatomy of each individual, motivation encompasses a multitude of factors that initiate, sustain, and direct our behaviors to obtain our goals. Considering this topic from a cross-cultural perspective allows one to learn about values, the very basis of cultures. The emphasis on looking at cross-cultural studies is also the product of many studies being WEIRD (Western, Educated, Industrialized, Rich, Democratic (Henrich et al. 2010), both when it comes to those conducting the studies and participants. With motivation being such a critical part of life, there is a clear value in looking at studies from different cultural groups.

Prior to delving into the multitude of theories surrounding motivation, it is crucial to examine the underlying neurobiology of motivation. The three main areas in the brain implicated in motivation and their attributed functions are the ventral striatum, which controls the reward-driven approach, the striatum and the orbitofrontal cortex (OFC), which are vital in value-based decision-making, and finally, the anterior cingulate cortex which controls goal-directed control (Kim, 2013). The OFC responds not only to primary rewards (e.g., food and sex) but also to secondary rewards (e.g., money and social rewards). A study conducted by Tremblay and colleagues (1999) found that the OFC calculates the “relative value” of each reward as opposed to responding to the “absolute value”. This results in humans only

responding to rewards with a higher relative value. A thought-provoking inquiry that has engaged the scientific community is whether or not there are neurobiological differences underlying intrinsic and extrinsic motivation. While these are established as two different psychological constructs, there has been no neuroscientific evidence to suggest that different brain structures or circuits enact these types of motivation. However, existing literature suggests it may still be helpful to differentiate between intrinsic and extrinsic motivation.

A neural study was conducted on positive affect which is defined as a “pleasurable engagement with the environment and the extent an individual feels enthusiastic, active, and alert” (Pang, 2016)). A connection between a person’s positive affect, motivation, and depression is made. The research demonstrates how in individuals lacking positive affect, there is a reduction of activity in the left frontal cortical regions of the brain. This suggests a lack of approach motivation. A study conducted by Telzer and colleagues (2013) found that Latin American adolescents who valued family-obligation more demonstrated an increase in activation in cognitive-control-related regions of the brain and a decrease in activation in regions of the brain related to risk-taking. This is just one example of how culture and values can impact motivation.

Intrinsic and extrinsic motivation fall into a larger picture of two innate types of motivation, approach motivation and avoidance motivation. These developmental psychological constructs are based on the fact that humans are drawn to things that will bring about a sense of pleasure and are repulsed by things that cause danger or harm (Kim, 2013). For example, a newborn is typically drawn to their mother as they provide safety and food while they may avoid loud growling dogs as they signal potential danger. Although the development of motivation in a child may seem to strongly rely on intrinsic motivation, extrinsic motivation plays a pivotal factor. Figure 1 summarizes the connection between the two. Young children are intrinsically motivated to explore and engage, but without the extrinsic motivation and praise of a caregiver, the brain will cease to prompt them to repeat any actions.

According to a study conducted at Harvard University in the Center for Developing Children (2018), the following timeline summarizes the changing points and critical stages of development. As a baby, simple preferences are learned (i.e., good or bad?). This is followed by the distinguishing of life-threatening dangers and general things to avoid. Exploration through active playtime is a critical step in the formation of intrinsic motivation and achievement. Peer influence, exploration, and performance feedback start to play a crucial role in motivational development into adolescence. Overall, it is important to understand the development of motivation throughout a lifetime as it can provide insight into how and when culture influences a person’s values and motivation.

The American Psychological Association defines intrinsic motivation as “an incentive to engage in a specific activity that derives from pleasure in the activity itself” (n.d). This is opposed to extrinsic motivation in which tasks are only completed in order to avoid punishment or earn a reward. Looking at both of these motivation types can provide interesting insight into cultural values and their impact on motivation.

Numerous studies have explored the impacts of intrinsic and extrinsic motivation in the context of education. The general consensus of most of these studies is that intrinsic motivation leads to more positive benefits. For instance, almost all studies found that deeper and more relaxed learning also occurs as a result of intrinsic motivation. This is in comparison to extrinsically motivated students who perform lower academically (Becker et al. 2010). In a study conducted by Areepattamannil and colleagues (2010), the relationship between motivation and

academic achievement was explored in Canada and India. In the study, 355 Indian student immigrants living in Canada and 363 Indian students living in India filled out a confidential questionnaire. The study found that Indian immigrant students living in Canada academically outperformed their Indian counterparts living in India. Interestingly, these same Indian immigrants demonstrated more intrinsic motivation, showing a possible correlation between the two factors. This study is, of course, not without possible flaws and unconsidered factors. Extraneous variables such as a family's finances and the opportunities presented in a certain country or school are definitely possible factors that may impact this connection.

There is a strong tie between intrinsic motivation and freedom of choice. Multiple studies have been conducted to determine a relationship between these two factors, but an especially relevant study is an analysis made by Deci and colleagues (1985). They theorized that people are more likely to "enjoy, to prefer, and to persist" activities in which they have autonomy and control over the outcomes. What these multiple studies have failed to do however is look at this from a multi or cross-cultural perspective. It merely assumes that freedom of choice is desired and that intrinsic motivation only results in positive outcomes.

A small study was conducted on both Japanese and American students residing and taking classes in Japan (Iyengar and Lepper, 1999). Each student created a list of choices that they make on an everyday basis and ranked the importance of each choice. American students indicated almost 50% of choices in their responses in comparison to their Japanese counterparts. These same students were also asked to make a list of things that they wished they didn't have a choice regarding. Nearly 30% of American students said they prefer having choices all the time. Now, how does this connect to intrinsic motivation? Those from non-Western countries tend to value interconnectedness and perseverance in the hope of bettering the group. In these countries, there is less intrinsic motivation to make choices as it may pose a threat to the well-being of the community as a whole. These deep-rooted values are reflected in all aspects of life, including education where pleasing one's family or community is more motivating than making a personal choice will be.

Looking at someone's motivation often reflects their values. In a study conducted by Iguisi (2009), people from France, Italy, Scotland, the Netherlands, and Nigeria were sent a survey to rank motivation-related values. Italians ranked "have challenging tasks, have the freedom to adopt their own approach to tasks and make a contribution to the success of their organization" as their top 3 most important motivation-value factors. The French have similar responses with their top 3 being "have challenging tasks, live in desirable areas, freedom of approach to tasks". The Scottish had "cooperation with others, lived in desirable areas, and challenging tasks". The Dutch ranked "live in a desirable area, cooperate with others, and have good physical working conditions" as their top 3. In Nigeria, people ranked "make a contribution to the success of their organization, to have challenging tasks, and have the security of employment" as their top 3. The results of the four European countries reflect many similarities in values such as having freedom in their workplace and living in a desirable area. This is in comparison to the motivation-related value of having security of employment which Nigerians put as one of their top three. While the specific cultural implications can be explored for each choice made by these 5 countries, a general point of importance is the tendency for Western countries to value individualism while Eastern countries value collectivism. A contribution to the success of one's company is ranked as more important to those in Nigeria and those in the Netherlands for example.

Motivation is highly rooted in culture and external factors. Motivation is often categorized as intrinsic and extrinsic and numerous studies have pointed to the benefits of being intrinsically motivated. The background and reasoning behind why a person may be more intrinsically or extrinsically motivated when it comes to education can be influenced by one's cultural values. The differences between a culture that values collectivism versus individualism are often reflected through motivation.

Conclusion and Educational Implications

Both emotion and motivation play a vital role in early childhood development and education. Fully understanding the factors that may affect such development is crucial. Furthermore, in a diverse community such as that of a classroom, understanding how culture affects these topics is essential in understanding students. This is particularly relevant for students and educators in the United States as according to the National Center of Education Statistics (2023), over 50% of students attending public school are people of color. The demographic is the following: 29% of students are Hispanic, 15% of students are Black, 6% of students are Asian, 5% of students are two or more races, and 1% are Native American. With the majority of studies being conducted are based on WEIRD and primarily white samples, it is important to shine a light on the impact of cultural differences and the educational implications of such differences. Emotion and motivation have proven to be highly variable not only in cultures but also for individuals. Being able to adapt a classroom environment and the lesson to fit student needs is important, especially for younger students. The purpose of understanding the cultural implications for learning is not to stereotype or categorize students. It is to understand the variability and fluidity necessary to implement in a classroom setting. Ultimately, the goal is to provide equitable educational opportunities and outcomes to students and access to a culturally sensitive education that prepares them for their future no matter their background. Education is an especially important opportunity to address and directly stop structural inequalities faced by ethnic minorities (i.e. income disparities).

It is well-established that the brain is not fully developed until an individual's late 20s. This fact is often used to excuse or justify poor decision-making in early adulthood and has gone as far as to impact the law, allowing minors to be charged with lesser sentences. Auditory emotional processing is typically developed over a lifetime. This is in comparison to visual emotional processing which is almost developed by age 11. When educating young individuals, it is important to understand that not everything will be fully understood and that social skills are continually developing. Taking into consideration how culture affects this development, adds another layer of complexity. Discipline is a large part of education and even life, but what happens when someone is not able to fully process that they are being disciplined? Different cultures may be more or less familiar with certain facial expressions and vocal tones. For instance, a teacher might pull aside a student to talk about their lack of enthusiasm and interest for learning, but it may turn out that the student is actually really passionate and that having a stoic presentation is how their culture demonstrates respect. In a classroom context, it is important to understand some of the communication barriers that come with both age and culture and to explain and clarify why a student is being punished.

One of the main commonalities between the different studies for both auditory and visual emotional processing is the presence of an ingroup bias, in other words, an advantage that makes connecting to and understanding someone with the same culture easier. An example of

this as seen in multiple studies is the increase in accuracy for both visual and auditory stimulus. In a classroom context, this could be a personal connection that a teacher makes to a student's situation, or as seen in the studies an increase in accuracy of identifying a student's emotions. The acknowledgment of this bias is important for both educators in an international context and those not as a classroom is typically an incredibly diverse community.

Similar to the development of emotional processing, motivation is a system highly influenced by external factors such as culture. Whether the motivation is intrinsic or extrinsic greatly impacts the situation and the emotions surrounding it. Intrinsic and extrinsic motivation can be traced back to cultural values of community and individualism. For example, a student may feel a lot of stress in a certain class because of parental pressure and the value and need to please their community (in this case their family). This impacts how much a person values or doesn't value personal choice. Awareness of the bigger picture is important as it helps educators understand their students with different backgrounds. Lessons, activities, and testing can be adjusted to better-fit students as a result of gaining a better understanding. An example that could be used in younger students more externally motivated is a sticker or point system or even something as simple as verbal affirmations.

Although it's crucial to understand cultural differences and the impact that it has on education, at the end of the day, each student has different needs. For example, the implications of negative emotions may have varying results on a person's education. From stunting a student from reaching their full potential to motivating students to work harder and achieve their goals, it may be hard to read between the lines. Understanding this is important because it highlights the fluidity and insight that a teacher must have on an individual level to guide and mentor each student to success.

One of the most impactful takeaways of this paper is simply to understand the difficulties that a student may face. Whether they are learning abroad, at an international school, or even at a school with a diverse community, students are bound to be impacted by the differences in culture in some way or another. Understanding and educating oneself on the differences and the impact of such differences is essential to being an empathetic and compassionate teacher. Furthermore, this understanding of such differences can alter lesson plans and the method in which concepts are taught.

A more specific example of this is seen through a need-supportive learning environment. According to the Department of Education (2017), a need-supportive teaching environment is one in which "teachers provide structure, autonomy support, and involvement, and thereby support their students' psychological needs for competence, autonomy, and relatedness". Haw and colleagues (2022) claim that there is comprehensive evidence to connect positive learning outcomes such as an increase in motivation and need-supportive teaching, even across various social and cultural contexts. In a study focused on need-supportive teaching and the stimulation of intrinsic motivation, data was drawn from the Program for International Student Assessment (PISA). Consisting of over 76 regions students' perceived need-supportive teaching was tested to see if intrinsic motivation was stimulated (Schwartz, 2006). It has been found through numerous past studies that intrinsically motivated students displayed greater success in diverse educational areas like reading and math (Froiland & Oros, 2014). What was found in the study conducted by Schwartz was that a significant number of students from various regions support and believe that need-supportive teaching would be beneficial due to its strong connections to intrinsic motivation.



Although some research has been conducted from a cross-cultural perspective, existing work is extremely limited. More research needs to be conducted using more diverse samples, not only racially, but also culturally. In addition to this, as commonly seen in the field of neurology, most studies heavily rely on the use of averages. This results in the loss of incredibly important information as emotion and motivation vary from person to person, making each individual unique. While it requires greater resources, more studies need to be in-depth as people are still unable to fully understand the human brain. It's also important to note that neuroimaging already needs an incredibly large amount of samples. Both the number of subjects and the diversity of subjects needs to grow.

Motivation is what drives human life. Emotions are what make life experiences unique and meaningful. If these two topics are such a vital part of life, why should studies be limited to a set population? Looking at these topics from a cross-cultural perspective is incredibly important in diverse settings such as the classroom. Even something as simple as acknowledging the differences is an essential step in opening education for all.

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