Making Sense of Learning with The Senses: Implementing a multisensory approach with EFL middle-childhood students

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By

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Abstract

This master thesis reports a qualitative research project guided by a descriptive approach whose objective was to describe the effects of the intensification of multisensory activities in the frame of engagement in the EFL class. It was conducted with 20 fourth-grade participants from a private school. Data were collected from video recordings, the teacher's personal diary, and the Multisensory Activities Engagement Questionnaire for Students (MAEQ). These instruments were analyzed and coded based on the theories of engagement and disengagement. The limitation was the scarce research on the multisensory channels especially taste, smell, proprioception, vestibular and interoception, particularly in the context of English as a foreign language and middle-aged populations.

The analysis of the data showed a high level of emotional and social engagement throughout the sessions, with the sight-hearing sessions displaying the highest degree of disengagement. The behavioral dimension was the one that exhibited the greatest disengagement. Furthermore, the sessions with higher levels of student´s output occurred in environments characterized by low anxiety and high experimentation. Finally, it was concluded that the varied levels of EFL output and engagement observed across the sessions reflected the diversity of abilities and the different sensory channels through which students received and processed input within the group.

Keywords: Engagement**,** Multisensory teaching, senses, middle-childhood, EFL.

Resumen

Esta tesis de maestría presenta un proyecto de investigación cualitativa guiado por un enfoque descriptivo, cuyo objetivo fue describir los efectos de la intensificación de actividades multisensoriales en el marco de la participación en la clase de inglés como lengua extranjera. El estudio se llevó a cabo con 20 participantes de cuarto grado de un colegio privado. Los datos fueron recolectados mediante grabaciones de vídeo, el diario personal de la docente y el Cuestionario de Participación en Actividades Multisensoriales para Estudiantes (MAEQ). Estos instrumentos fueron analizados y codificados con base en las teorías de engagement. La principal limitación fue la escasa investigación existente sobre los canales multisensoriales, especialmente el gusto, el olfato, la propiocepción, el sistema vestibular y la interocepción, así como su relación con la enseñanza y el aprendizaje en poblaciones de mediana edad escolar, particularmente en el contexto de la enseñanza del inglés como lengua extranjera.

El análisis de los datos mostró un alto nivel de engagement emocional y social a lo largo de las sesiones, siendo las sesiones de vista-oído las que presentaron el mayor grado de disengagement. La dimensión conductual fue la que evidenció mayor disengagement, debido a distracciones temporales, principalmente causadas por los elementos externos y por las reacciones sociales. Además, se evidenció que las sesiones con mayores niveles de producción por parte de los estudiantes ocurrieron en ambientes caracterizados por baja ansiedad y alta experimentación (en la sesión con todos los sentidos, gusto-olfato). Finalmente, se concluyó que los niveles variados de participación y uso del inglés observados a lo largo de las sesiones reflejaron la diversidad de habilidades y los diferentes canales sensoriales a través de los cuales los estudiantes recibieron y procesaron el input dentro del grupo.
Palabras clave: Compromiso-Enseñanza multisensorial, sentidos, infancia media, EFL.

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Chapter 1

1.1. Introduction

Since humanity's earliest interaction with the world, the use of the senses has been fundamental for survival and learning. During the Renaissance, human nature and sensory perception were highly valued. However, since the Enlightenment, greater priority has been given to reason, objectivity, and logic. Horkheimer and Adorno (1947/2002) argued that "For enlightenment, anything which does not conform to the standard of calculability and utility must be viewed with suspicion... Enlightenment is totalitarian." (p. 6). This worldview continues to prevail, privileging what is measurable, precise, and structured. Consequently, foreign language teaching and learning have emphasized structural approaches. As Derrida asserted, "everything is explained by structure" (as cited in Durand et al., p. 385), a perspective reflected in curricula, lesson plans, and linguistic textbooks. In Colombia, the current framework for learning English as a foreign language established by the Ministry of National Education is the Derechos Básicos de Aprendizaje (DBA), which is based on the Common European Framework of Reference for Languages (CEFR; Council of Europe, 2001).

These structural approaches have prioritized writing and have led English teachers to follow level-based content organization and to focus primarily on the development of the four language skills speaking, writing, listening, and reading through activities proposed in foreign curricula and textbook materials. For instance, in the textbook Wonder Family 3 (2022) used by the participants in this study, visual and auditory modalities predominate, as evidenced by frequent instructions such as "observe," "read," "listen," and "look," with minimal attention to

movement or kinesthetic dimensions (e.g., vestibular and proprioceptive processes). A review of instructional materials revealed no activities designed to promote learning through other sensory modalities, such as touch, smell, or taste, within English as a foreign language (EFL) instruction for middle childhood.

Since Aristotle, a presumed universal hierarchy of the senses has positioned vision as dominant, followed by hearing, touch, taste, and smell. Contemporary English language teaching methods and standards appear to perpetuate this traditional privileging of visual and auditory modalities over other sensory experiences in curricular documents, lesson plans, and instructional materials. Majid et al. (2011) argued that there exists a "long-standing presumption in Western thought that vision and audition are more objective than the other senses and that perspective has served as the basis of knowledge and understanding" (p. 1). This Western epistemological stance aligns with the needs of industrialism (Robinson, 2006, 11:29), which conceptualizes intelligence primarily in terms of literacy and standardization. Such a perspective has shaped societal attitudes toward learning, often fostering environments that discourage error and creativity. This raises the question of whether education has neglected the role of sensory experience. Nietzsche suggested that the "true world of reason" has resulted in the devaluation of sensory reality, turning against the body and life itself (as cited in Durand et al., p. 205). Thus, teaching and learning processes grounded exclusively in essential structures may have marginalized the body and its sensory capacities. As Robinson (2006) contended, "we need to radically rethink our view of intelligence and rethink the fundamental principles on which we are educating our children" (18:24).

The primary objective of structural approaches in EFL education is often to prepare

students for standardized examinations such as IELTS, TOEFL, and Cambridge assessments, as well as for university admission. As a result, opportunities for creativity and sensory exploration appear limited within this educational framework. Morgan (2021) noted that examinations do not necessarily measure the extent to which students engage in active learning (p. 129).

In Colombia, both public and private schools participate in continuous competition to demonstrate higher levels of English language proficiency, which primarily emphasizes grammatical knowledge, reading comprehension, and listening skills. These assessments rely predominantly on auditory and visual modalities, thereby disadvantaging learners who depend more heavily on other sensory channels or, as Howard Gardner (n.d.) suggests, on different forms of intelligence in foreign language learning. As a result, such practices may generate frustration, rejection toward the subject, or low academic performance.

1.2.Statement of the problem

The problem addressed in this study concerns the limited knowledge and scarce empirical research on multisensory channels, particularly taste, smell, and interoception and their relationship with teaching and learning processes in middle-aged populations, specifically within the context of English as a Foreign Language (EFL).

Most existing research on sensory stimulation has been conducted in early childhood education, among learners with disabilities, or within neurodiverse populations such as individuals with autism. For instance, Hannant et al. (2023) developed an observational questionnaire to assess 174 children's learning at the beginning of their educational trajectory in England (p. 167). Their instrument incorporated five developmental domains associated with

learning and emotional well-being, including internal senses (proprioception and vestibular input) and external senses (auditory, visual, and tactile). However, their study excluded interoception, taste, and smell, which are among the least examined sensory modalities in academic and cognitive research (Hannant et al., 2023). The findings revealed significant correlations between internal senses and both fine and gross motor skills (p. 172) and emphasized the importance of holistic curricular adaptations (p. 174). Although these results contribute to understanding children's learning processes, they do not address underexplored sensory channels or older learner populations.

Similarly, Pishghadam et al. (2024) demonstrated that enriched multisensory input enhances English learners' mental agility and facilitates the retention and retrieval of information over short intervals (p. 1067). Their study showed that multisensory-based instruction accelerates information retention when compared with traditional audio-visual approaches. Nevertheless, the literature continues to prioritize the senses of sight, hearing, and writing in language learning. Majid and Levinson, (2011) argued that the dominance of "writing culture" has contributed to the marginalization of other sensory modalities (p. 6). This tendency aligns with the notion of the disembodied nature of contemporary study, which privileges textualization while neglecting embodied sensory experiences. Furthermore, some psychologists, such as Schachtel (1959, as cited in Asifa Majid and Levinson, 2011), have argued that language processing is primarily associated with distal senses, particularly vision and hearing. This perspective has contributed to the marginalization of proximal and internal sensory channels in theories of language and cognition (Majid and Levinson, 2011, p. 7).

In contrast, evidence from neuroscience and educational psychology underscores the importance

of multisensory engagement in learning. Shams and Seitz (2008) stated that "the human brain has evolved to develop, learn and operate optimally in multisensory environments" (p. 411).

From a constructivist perspective, Jean Piaget (1958) asserted that assimilation and accommodation require active learners rather than passive recipients of information, as problem-solving skills are constructed through interaction with the environment (p. 56). Consequently, learning should be student-centered and supported through active discovery processes. Farida et al. (2022) emphasized that instruction should prioritize learning processes over products, promote active and collaborative methods, and create pedagogical situations that foster cognitive disequilibrium appropriate to learners' developmental levels (p. 58).

Moreover, recent neurological research indicates that both cerebral hemispheres contribute to language processing. Edjidjimo (2022) further argued that providing adequate stimuli enables older children and adolescents to learn a language successfully through associations and meaningful connections (p. 41).

Despite these theoretical and empirical contributions, a significant gap remains in research examining how underutilized sensory channels, particularly taste, smell, and interoception can be systematically integrated into EFL instruction for middle-aged learners. This lack of empirical evidence limits teachers' capacity to design pedagogical strategies that fully engage learners' sensory systems and promote meaningful and durable learning experiences. Therefore, there is a clear need for studies that investigate the role of these multisensory modalities in EFL teaching and learning.

1.3.The problem.

The school in which this research was conducted adopts the Common European Framework of Reference for Languages (CEFR; Council of Europe, 2001) as its principal guideline. Consequently, instructional materials, the curriculum, and lesson plans emphasize measurable learning outcomes, primarily prioritizing visual and auditory modalities. As the English teacher, I am required to comply with institutional expectations established by academic coordinators and parents, some of which directly influence my pedagogical practices. These expectations include completing all prescribed textbook content and strengthening students' performance on standardized assessments.

Although the institution promotes academic freedom in lesson planning, assessment practices, curricula, and textbooks continue to reproduce traditional pedagogical approaches focused on rote memorization of decontextualized language forms. Additional factors also influence English instruction. Students' prior experiences with the language, including former teachers, classroom practices, textbooks, and peer interactions, shape both their individual and collective identities in relation to English, which many perceive primarily as an academic, writing-centered subject.

Identifying sufficient theoretical support for language instruction during middle childhood has proven challenging, as this developmental stage has been described as under-theorized or overlooked in educational research. This gap has been referred to as "the forgotten years" (Mah and Ford-Jones, 2012). Classroom observations indicate that some learners experience difficulty acquiring English through predominantly auditory and visual channels. Many students demonstrate stronger development in kinesthetic, interpersonal, naturalistic, and

spatial intelligences, which has resulted in disengagement from English lessons and, in some cases, academic failure. Others complete the activities proposed in instructional materials but maintain limited meaningful contact with the language in their everyday lives.

As a result of this pedagogical reflection, this study seeks to further explore the multiple channels through which human beings learn and the ways in which these channels can enhance linguistic input. The purpose of this inquiry is not only to promote language experiences oriented toward acquisition but also to foster greater student engagement and improve learners' perceptions of English as a school subject. Traditionally, English instruction has been conceived primarily as a space for acquiring knowledge through auditory and visual modalities, with kinesthetic engagement limited to brief classroom movements or peer interaction. A potential response to student disengagement, as well as to the influence of academically and socially legitimized practices that privilege only certain sensory modalities in English as a foreign language (EFL) teaching and learning, lies in making visible and pedagogically relevant the less-explored senses during the middle childhood stage.

1.4.Research question

This research aims to balance the use of all the sensorium for the learning of EFL in 4th grade students, putting aside the universal hierarchy presumption of the senses by answering the research question:

How does the intensification of multisensory activities impact fourth grade EFL students' use of English and engagement?

The term *impact* in the research question refers to emergent meanings and behavioral patterns in students' engagement, as interpreted through qualitative and quantitative data from observations, diaries, and questionnaires. It does not imply a positivist measure of causal effect; rather, it is grounded in an interpretative hermeneutic stance that focuses on identifying emerging themes. From this perspective, recurring patterns, such as the predominance of the same sensory channels in EFL classes prescribed by the curriculum are understood as constituting an impact in themselves. As Gadamer suggests "understanding is not static but a fusion of horizons" (cited by Dawson, C, 1996, p.47). In this study, 'impact' represents the horizon of understanding that emerges between pedagogical intention and student development.

1.5.Research objective

To describe the effects of the intensification of multisensory activities in the frame of engagement in the English as a foreign language class in fourth grade students.

1.6. Specific objectives

1. To identify students' use of English through the multisensory activities proposed in English Foreign language classes.
2. To appraise the students' engagement in the EFL class through observations, artifacts, diaries and questionnaires.
3. To examine how the teacher's performance and professional insights evolve throughout the research process.

1.7.Rationale

The reasons for justifying a project like this arise from two dimensions: the epistemological and the applied one. The first seeks to balance the importance that all the senses have for human beings in their learning and exploration of the surrounding world. It aims to demystify false assumptions that have been socially, and for political, economic, and/or power-related reasons, constructed throughout history and that are still evident today in educational impositions such as curricula and textbooks, where the senses continue to be hierarchized for EFL learning.

The second dimension seeks to highlight the importance of involving all the senses in the teaching and learning of English as a foreign language and to make a first conscious attempt in the research context to explore all of them in the classroom, thereby stimulating all the channels students have to learn about the world around them. It is complex for us teachers to implement multisensory learning and foster all the multiple intelligences that characterize each student in a single class because of time limitations and resource preparation requirements.

However, curricular practices can be gradually enriched to transcend models that prioritize writing and purely cognitive processes in primary education, thereby creating space for learning through embodied engagement. Precisely, this is the pedagogical objective of the current research: to offer an alternative environment to the standard curriculum that complements abstract knowledge through concrete elements and extensive sensory exploration.

This integration will allow the English language to be perceived from diverse perspectives, fostering meaningful learning deeply connected to the students' immediate context. On a linguistic level, the aim is to reduce anxiety levels and mitigate negative perceptions of the subject, establishing a more open and secure environment for natural communication in the

foreign language. Furthermore, by emphasizing qualitative self-evaluation and process-oriented assessment, this approach seeks to provide a balanced contrast to the traditional curricular evaluations and pedagogical practices focused solely on strength some senses and numerical outcomes.

This project seeks to contribute to achieving embodied EFL learning in the field of middle childhood or primary education, standing in resistance to a structured, traditional world. As Fugate et al. (2018) affirm, "Embodied cognition is opposed to the traditional position of seeing the body as a passive observer to the brain" (p. 274).

Another relevant aspect within the applied dimension is, likewise, the demystification of the use of multisensory teaching solely for students who experience certain types of disabilities or have been identified as neurodiverse. The educational community teachers and institutions that promote bilingualism in Colombia, such as the National Ministry, must become aware of the complexity of learning, the channels through which input is received, and the particular yet often invisible characteristics of middle childhood. It is essential to further explore this little-known but vital field, as it is fundamental not only for the discovery of the world but also of languages among our students.

It is therefore important to continue researching this field so that the teaching of English as a foreign language can better integrate processes of acquisition[1], characterized by exploratory and diverse experiences, with formal learning [2] processes that involve explicit and reflective

[1] Krashen (1982) defines acquisition as a subconscious process, through meaningful interaction and exposure to comprehensible input, without an explicit focus on grammatical rules. (p. 10).

[2] Learning is described as a conscious process that involves explicit knowledge about language, such as grammar rules and metalinguistic awareness. (Krashen, 1982).

performance.

Chapter 2. Literature Review

In the Colombian and broader South American context, some studies have examined the role of some practices that promote sensorial channels in EFL learning. In a systematic review of Colombian journal publications, Kaya et al. (2025) analyzed 104 articles and found that Total Physical Response (TPR) and game-based learning, both of which emphasize physical movement and tactile interaction, were the most effective strategies used by Colombian teachers to promote emotional engagement among children. Their findings indicate that by activating the vestibular (balance) and proprioceptive (body position) systems, teachers were able to reduce learners' language anxiety (p. 256).

One of the most comprehensive studies addressing the relationship between sensory engagement and EFL instruction in Colombian primary education was conducted by Rojas (2013) from Pedagogic University. Using sensory-based teaching as a strategy to optimize the school environment, Rojas identified meaningful connections between students' prior knowledge and newly introduced foreign language content. Furthermore, her study demonstrated that sensory-based instruction facilitated the inclusion of learners with diverse cognitive styles in the English classroom.

Another relevant investigation focusing on sensory exploration in EFL instruction was carried out in Ecuador by Alvarado et al. (2025). This study examined the integration of multisensory instruction in English vocabulary acquisition among third-grade students through a mixed-methods design. Instruction was organized around the senses of sight, taste, touch,

hearing, and texture and was supported by audiovisual, kinesthetic, and tactile resources such as flashcards, videos, posters, textured materials, songs, movement-based activities, and realia. (p. 2571). Although these studies do not consistently address all sensory modalities (e.g., taste and smell are less frequently explored), their findings demonstrate that the implementation of multisensory instruction resulted in a notable increase in both vocabulary retention and learner engagement. Moreover, the authors concluded that this approach "enhanced learners' understanding of lexical items in terms of form, meaning, and use, and positively influenced students' overall learning experiences" (Alvarado et al., 2025, p. 20).

Regarding engagement, the findings are consistent with theoretical claims indicating that the highest levels of disengagement tend to occur during secondary education (Wigfield et al., 2015, as cited in Fredricks et al., 2019, p. 10). This tendency has led many educators to prioritize the incorporation of strategies aimed at promoting engagement primarily among adolescent learners. However, given that the characteristics of that population differ substantially from those of the participants in the present study, and that the factors influencing the activation of engagement and disengagement dimensions vary considerably between age groups, research focused on secondary education was not included in this review to avoid theoretical overload.

Within the Colombian context, only one study addressing engagement in middle childhood within the teaching of English as a foreign language was identified. Arango (2024), in the study Using ICTs to Promote EFL Third Graders' Engagement, implemented various audio, visual, and audiovisual materials, as well as games, to examine forms and changes in students' engagement. Data were collected through pre- and post-interventions. Data analysis revealed that the use of ICTs, which involved an intensification of certain sensory channels, fostered students'

vocabulary learning and retention, increased their willingness to participate orally, and improved their on-task behavior (Arango, 2024, p. 9).

These previous studies highlighted the ongoing need for EFL teachers to seek authentic learning experiences that allow students to use their bodies as part of the learning process, thereby fostering greater participation, engagement, and connection with the foreign language within a safer learning environment. Such antecedents were particularly valuable for the present study, as they support the expansion of learning through the incorporation of additional sensory modalities, including interoception, taste, and smell.

Chapter 3. Theoretical Framework

This chapter describes in detail the concepts, theories and the background that provide the basis for this study. To develop this research project, five main concepts were considered, which are defined, discussed and analyzed by different authors. Concepts of the human senses and their relationship with learning. The epistemological and historical foundations that have led to the recognition or invisibility given to each sense at a sociocultural and academic level. Multisensory teaching, engagement, disengagement and Middle childhood learning, focusing on Piaget's stage theory and multiple intelligences theory.

2.1. Human Senses

Although language tends to privilege descriptions of sight and hearing, all the senses are essential for learning about the external environment. Knowledge is acquired through the use of multiple sensory modalities, each of which provides a distinct pathway for learning, whether

operating independently or in combination. While each sense has intrinsic value, the senses are designed to function in an integrated and complementary manner (Shams & Seitz, 2008).

As Staley (2006) stated, "All the senses are potential information receivers and knowledge receptors" (p. 2). Similarly, the Genetics Science Learning Center explains that the brain frequently integrates information from multiple sensory systems through a process known as sensory integration (University of Utah, n.d.). This process involves the transmission of sensory input from various modalities to associative brain regions, where the information is combined and interpreted. Neural pathways are formed in correspondence with the sensory systems employed during learning. When multiple senses are engaged, these neural connections are more readily reactivated, facilitating recall and knowledge retrieval.

From an epistemological perspective, although sensory-based explanations of survival and learning have been widely proposed, humans have also been characterized as "animals seeking patterns" (Martínez, 2002, p. 36), striving to impose coherence on the multiplicity of stimuli received through the senses. This interpretive capacity is made possible by neural structures that process sensations to generate abstract concepts, identify relationships, and construct patterns (Martínez, 2002, p. 37). Consequently, signifiers and meanings are omnipresent but variable. As Martínez (2002) argued, there exists an "omnipresence of interpretation" (p. 36), whereby individuals and social groups perceive and conceptualize reality in distinct ways. Sensory-based interpretations of the world vary according to physical, environmental, and social needs, shaping the semantic fields used to describe experience.

Cross-linguistic evidence further illustrates the cultural valuation of the senses. For example, in the Tepehua language, the term *t'us'akamin* refers specifically to the odor left

behind by an animal after it passes. Majid and Levinson (2011) maintained that "language (a particular tongue[3]) offers us key insights into how other peoples conceptualize the senses" (p. 7). Such linguistic distinctions provide insight into how different cultures prioritize and encode sensory experience.

Socially constructed categories are embedded in both the description of sensations and the ways in which the senses mediate interaction with the external world. As Kant proposed (1781/1998) argued that objects are known "only as they appear to us, not as they are in themselves" (A42/B59).

Cambridge dictionary defines a sense as "an ability to understand, recognize, value, or react to something, especially any of the five physical abilities to see, hear, smell, taste, and feel". Different sense organs deal with different forms of stimuli and serve different purposes (2025). Each sensory organ is specialized for processing a particular type of information; however, these systems operate collaboratively rather than independently. This interaction is referred to as multisensory integration, defined as "the process of neural integration of different sensory modalities, where information from multiple senses is combined to form a unified perception" (Axelrod et al., 2015, p. 35).

Theoretical approaches to the senses have traditionally been organized into paired groupings, both for the theoretical reasons outlined above and because, historically and linguistically, sensory experience has been fragmented and hierarchized. Consequently, it is

[3] "Language as a particular tongue" refers to language understood as a specific, culturally situated linguistic system. Majid and Levinson (2011).

necessary to examine each sense individually and, subsequently, to develop a synthesis that articulates their interrelationships within a unified framework.

2.1.1. Olfaction/smell and taste

Majid et al. claimed that there is a "long-standing presumption in Western thought" that vision and audition are more objective than the other senses and that they have served as the basis of knowledge and understanding (Majid et al., 2018, p. 11369). According to them, this presumption started when Aristotle organized the senses hierarchically, putting sight as the dominant sense, followed by hearing and then the others (smell, touch, and taste).

Another author who notably influenced the hierarchization of the senses was Broca, who, according to Olofsson (2024), although Broca discovered that human intelligence, located in the frontal lobes, was illuminated by all the senses, he chose to frame his findings in a way that avoided conflicts between science and the Church. Broca decided to divide animals between those that are controlled by the sense of smell (such as rats and rabbits) and those that, on the contrary, "are no longer governed by smell," giving priority to thinking and categorizing this sense as "bestial" (Olofsson, 2024, p. 22). For this reason, from Western thinking, non-European cultures that had prevalence in the sense of smell with their culture and traditions were considered "primitive" and of a lower intellectual level (Olofsson, 2024, p. 22). Smell and language were presented as opposites.

This degrading thought about the importance of smell was reaffirmed by the Church and by science in anatomy and medicine books to such an extent that, for humans, it has prevailed until today, where, according to Olofsson (2024), several people have claimed to prefer having their cell phone to this sense (p. 22). This demonization of smell for so long could be the reason for

the poverty in language to express richness of smells that human beings can perceive, as several scientists, such as the zoologist Matthias Laska (as cited in Olofsson, 2024), argued that the human sense of smell was clearly better than that of most other animals (p. 24). Although human olfactory bulbs account for only 0.01% of the entire brain, there are approximately 10 million interconnected neurons in the olfactory bulb, the same as a rat.

Based on Olofsson (2024), there are dimensions that we cannot describe with words: “the sense of smell seems to be much more complex than both sight and taste” (p. 25). It seems that the process of uncovering this meaning is prolonged and challenging for both scientific inquiry and linguistic understanding. By now, it is known that the sense of taste works with smell, sharing organs such as the mouth and throat. Many flavors are released in the mouth when we eat, stimulating the olfactory receptors in the nasal cavity.

The sensory receptors for taste are located inside small bumps on the tongue, known as papillae. In each papilla, there is a cluster of taste buds. According to NCERT (n.d.), there are around 10,000 taste buds in humans (p. 88). There are just four basic tastes sweet, sour, bitter, and salty, despite the fact that people claim to be able to differentiate a wide variety of flavors in food. Therefore, how do we sense so much more? The response is that, in addition to the food's flavor, we can also perceive its texture, temperature, pressure on our tongue, fragrance, and a host of other sensations. Only four fundamental tastes remain when these elements are taken out of the equation. This lack of lexicon to refer to smell evidences the underutilization of language to express the potential of the human sense of taste. However, this aspect does not permeate all languages. As Majid et al. (2011) affirmed, “languages curtail or elaborate their treatment of each of the senses, and in so doing hint at the cultural landscape of the senses” (p. 8).

People's experiences and educational opportunities in various cultural contexts also have an impact on their perception. For example, Majid and Levinson (2011) mentioned that internally refracted divisions of labor provide specialized registers such as those of gourmets, wine tasters, and perfumers, or, in the case of some languages such as Lao and Kri, may also provide superior discrimination abilities for taste sensations (p. 11).

According to Staszko et al. (2020), "taste information from peripheral nerves is carried to the brainstem, and from there relayed to the thalamus, cortex, and limbic forebrain areas that play diverse roles in feeding, associative learning, and reward" (p. 2). They found in their research with rodents that taste could include connectivity with other areas, such as those related to the nature of taste representation, learning, and functional implications. It is clear that the path toward the linguistic enrichment of the sense of taste should continue, in this case in Spanish as a mother tongue and in EFL, in order to expand the lexicon and, in this way, be able to break with the same limitations that language currently presents.

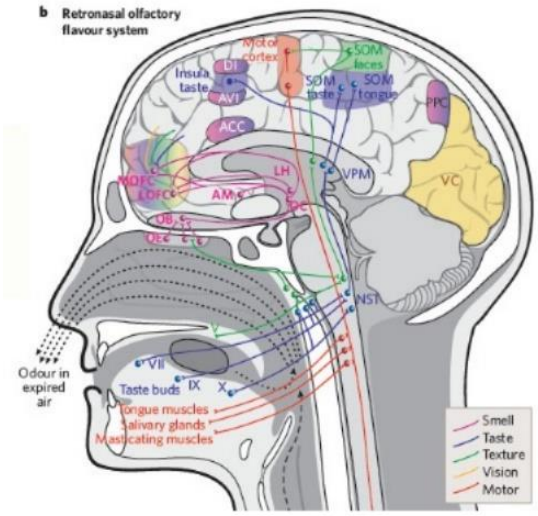
Neuroscientist Gordon Shepherd (2006) challenged the myth that humans have poor smell compared to animals. In his earlier work, he argued that the human olfactory system has been underestimated. His view that retro nasal smell is central to how humans perceive flavor, considering this is a human specialty (p. 25). Shepherd's work demonstrated that smell is not a secondary sense but a central neural system in which odor representations are transformed into "odor images" and integrated with other sensory, cognitive, and emotional processes to construct complex perceptions such as flavor. (Shepherd, 2006).

As these authors indicate, these senses have been little explored in the field of learning; for this reason, it is extremely important to begin giving them the same privilege that the other

senses have in academic research, particularly in the teaching and learning of English as a foreign language. (p. 318).

Figure 1

Smell images and the flavour system in the human brain



Note. From "Smell images and the flavour system in the human brain," by G. M. Shepherd, 2006, Nature, 444(7117), 316–321 (https://doi.org/10.1038/nature05405). Copyright 2006 by Nature Publishing Group.

2.1.2. Interoception

In the world of the senses, scientists, linguists and researchers have expanded and specified the human sensory system, its internal connections and the outside world. Touch, smell, taste, sight, and hearing have always been the five basic senses. Nevertheless, it is necessary to go deeper and identify not just how human beings perceive the external, but how they perceive their internal needs. Based on Barker M et al (2021) Interoception means "sensing internal signals from your body" (section, para. 1). Rather than functioning as a single determining factor in

learning, these elements should be understood as part of a dynamic set of conditions that influence students' readiness to engage in classroom activities. They contribute to whether learners can attend to a lesson successfully or experience difficulties in doing so, insofar as they enable students to become aware of their bodily states through the signals the body provides. According to these findings, it was considered relevant to begin the research with interoception activities, as internal feelings could also affect children's behavior in unexpected ways, including their emotional experiences and decision-making (external perceptions).

In the context of English classes, attending to these basic internal needs also requires that they be addressed through meaningful linguistic input and opportunities for output, allowing students not only to recognize such states but also to express them in the target language. In this way, language use becomes a tool for regulating participation and engagement, rather than merely a vehicle for academic content.

2.1.3. Vestibular and Proprioception

It was decided to unify these two concepts since it has been evidenced that they work together. As indicated in the research by Cullen and Zobeiri (2021), while the vestibular system detects and encodes head motion, proprioceptors provide feedback about body and limb position (p. 30). This research with monkeys demonstrated how the proprioceptive and vestibular systems effectively work together to provide us with our "sixth sense" in daily activities (Cullen & Zobeiri, 2021, p. 31). When an animal moves its head voluntarily, the brain predicts the sensory consequences of that movement. If the incoming proprioceptive information matches this prediction, the vestibular system reduces its response to the self-produced motion.

This mechanism allows the nervous system to distinguish between movements generated by the organism itself and movements caused by external forces, supporting stable perception and motor control (Cullen & Zobeiri, 2021).

One crucial sensory system that significantly influences our subjective perception of movement and spatial direction is the vestibular system. It consists of five sensory organs that are situated near the cochlea in the petrous portion of the temporal bone. The vestibular system is special because its neurons receive direct peripheral afferent input in the vestibular nuclei. In addition, it sends direct projections to motoneurons to generate essential reflexes mediated by the vestibulo-ocular and vestibulo-spinal pathways (Cullen & Zobeiri, 2021, p. 32).

According to NCERT Psychology (2007), the vestibular sense gives us information about body position, movement, and acceleration, which are essential for preserving equilibrium.

The inner ear contains the sensory organs for this sense (p. 88). Based on Seo et al. (2023), proprioception is the part of somatosensation[4] that enables perception of body position and motion based on information derived from internal sensing structures. Loss of proprioception can lead to sensory ataxia, poor balance, and incoordination, which are worsened in the absence of visual compensation.

These sensory systems are directly related to English output because bodily engagement can support both comprehension and production of language. When learners move, orient themselves in space, or manipulate objects while using English, linguistic input becomes associated with

[4] Somatosensation is the system responsible for processing bodily sensory information, integrating inputs from the skin and internal receptors to support perception of body position and movement (Seo et al., 2023).

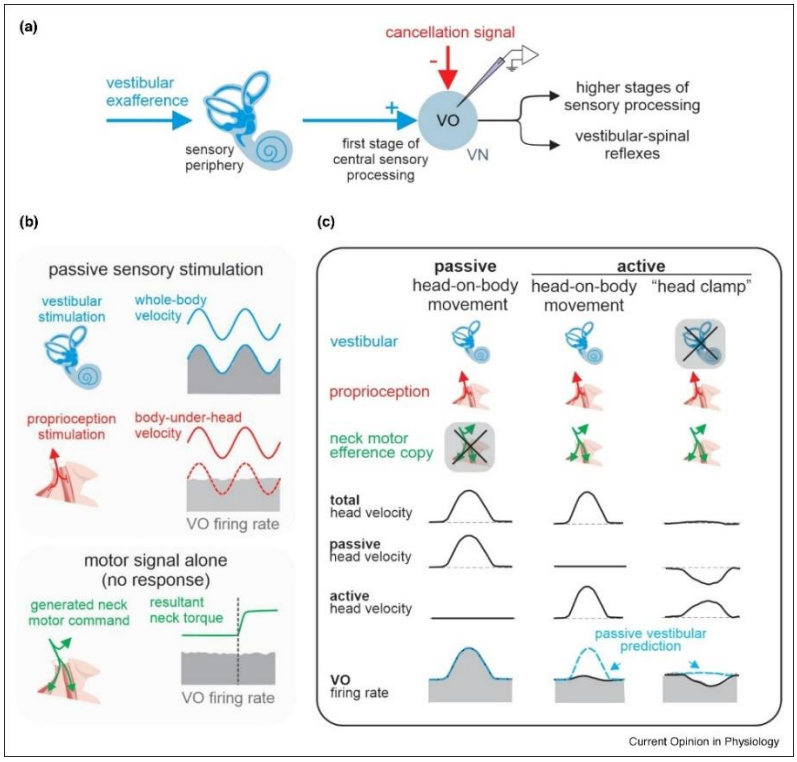
sensorimotor experience. This association facilitates memory, supports conceptual understanding, and strengthens the link between meaning and form. For example, verbs of motion, spatial prepositions, imperatives, and descriptive language (e.g., turn left, stand up, reach for the book, balance on one foot) can be reinforced through proprioceptive and vestibular activation. As a result, language output is not only verbal but also embodied, allowing learners to express meaning through coordinated verbal and physical action.

However, certain classroom situations in the investigation context such as highly test-oriented instruction or prolonged sedentary practices minimize opportunities for bodily engagement. These exceptions highlight the need for adaptable strategies that allow for multisensory participation without forcing uniform physical performance. Alternatives may include imagined movement, small-scale gestures, or spatial language tasks using visual or manipulative supports.

Including proprioceptive and vestibular senses in EFL instruction is therefore not a matter of replacing traditional auditory and visual input but of complementing them. Their integration broadens access to meaning-making processes and supports learners whose strengths lie beyond verbal or visual channels. By activating these sensory systems, English learning can become more experiential, contextually grounded, and connected to the learner's bodily awareness, fostering more stable language acquisition and more meaningful communicative output.

Figure 2

Self-motion perception through proprioceptive and vestibular integration.



Note : Adapted from Proprioception and the predictive sensing of active self-motion, by Cullen, E., & Zobeiri, O. A. (2021), Current Opinion in Physiology, 20, 29–38 (https://doi.org/10.1016/j.cophys.2020.12.004). Copyright 2021. Elsevier.

2.1.4. Sight and hearing

Vision, or sight, is the sensory modality responsible for detecting and processing visual stimuli from the environment. Among the human sensory systems, vision is considered the most highly developed, as approximately 80% of interactions with the external world rely on visual input (National Council of Educational Research and Training [NCERT], 2007, p. 87). Individuals with normal color vision can distinguish more than seven million color shades, and visual perception has been systematically described through categories such as primary,

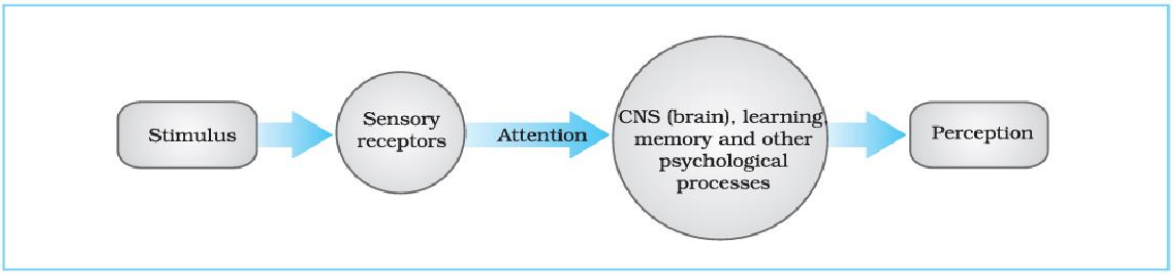
secondary, and tertiary colors; dimensions of hue, saturation, and brightness; and features such as shape, light, shadow, and blind spots. One distinctive characteristic of visual perception is the persistence of sensory effects after the visual stimulus has disappeared, a phenomenon referred to as *afterimage* (NCERT, 2007, p. 87).

Sense organs function as sensory receptors that collect information from the environment and transmit it to the brain for processing and storage in memory. However, humans are unable to attend to or interpret all available stimuli simultaneously. For this reason, knowledge of the surrounding world depends on three fundamental processes: sensation, attention, and perception (NCERT, 2007, p. 86). Sensation refers to the initial registration of a stimulus by a specific sensory organ. Only a portion of environmental stimuli becomes meaningful through observation, which should not be understood merely as visual inspection, as defined by the Real Academia Española (RAE, 2025) as "to look carefully," but rather as a multisensory process. In this regard, Echeverría (2010) defines observation as the use of all the senses to perceive and examine a phenomenon as it presents itself (p. 17).

Attention is the process through which specific stimuli are selected from among many, while perception involves the interpretation and attribution of meaning to sensory input (NCERT, 2007, p. 97). Concentration refers to directing attention to particular objects while temporarily excluding others, thereby shaping perceptual experience. Because attention and perception are mutually dependent, they are commonly understood as interrelated components within a broader cognitive system.

Figure 3

Showing Sub-processes of Perception



Note : Source Psychology, NCERT, (2007, p.97).

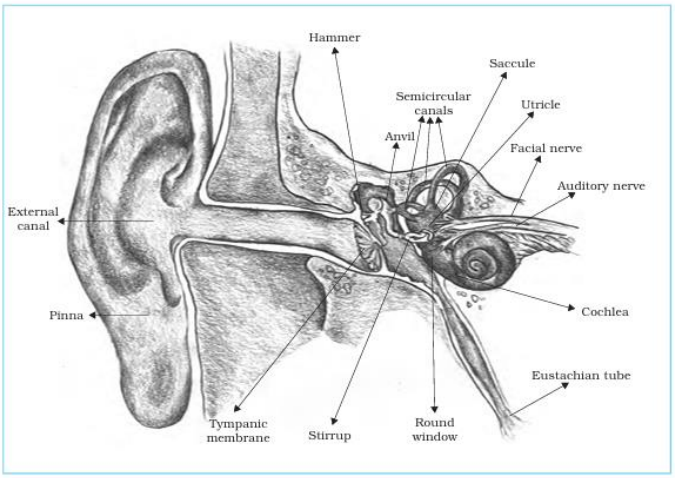
The auditory system, whose primary receptor is the ear, fulfills both perceptual and postural functions. In addition to enabling hearing, it contributes to balance and spatial orientation. Auditory sensation begins when sound waves reach the ear and activate the auditory receptors. This system can be described in terms of physical properties such as frequency and amplitude, as well as psychological dimensions of sound, including loudness, pitch, and timbre (NCERT, 2007, p. 90).

Sight and hearing operate in close coordination during perception and learning. Visual input supports the interpretation of auditory information, while auditory cues enhance visual recognition and attentional focus. This multisensory integration is particularly relevant in language learning, as learners rely simultaneously on visual cues (e.g., gestures, facial expressions, and written text) and auditory input (e.g., pronunciation, rhythm, and intonation). Through auditory exposure, learners internalize the phonological and prosodic features of the language, which enables them to discriminate between similar sounds and infer meaning from tone and context. In EFL instruction, activities such as songs, storytelling, and audiovisual materials therefore create more immersive learning environments by engaging both sensory

channels, strengthening comprehension, and facilitating meaningful language acquisition.

Figure 4

Structure of the human ear.



Note : Source Psychology, NCERT, (2007, p.92).

2.1.5. Touch

As mentioned in NCERT psychology (2007), Skin is a sensory organ that produces sensations of touch (pressure), warmth, cold, and pain. In humans' skin there are specialized receptors for each one of these sensations. However, skin's touch receptors are not dispersed equally, as a result, certain parts of the body, like our face and fingertips are more sensitive than others. (p. 90). As previously stated, the senses are widely explored during the early school years or the stage called young learners. The sense of touch is not the exception, as it is extensively developed during this stage. However, it seems that in primary school, this exploration of touch fades away, remaining merely at the level of hand–paper contact.

Several investigations such as Coy et al., (2017) research have widely explored touch during the early school years, or the stage called young learners. They showed that the children's preference for tactile targeted stimulation was similar to those obtained in adolescents and adults, linking

this sense with pleasantness (p. 1). The pedagogical integration of tactile exploration has the potential to nourish ELT practices by creating learning contexts that are both emotionally safe and sensorially engaging. Given that touch has been linked to experiences of pleasantness, its careful and respectful use can help reduce anxiety and support a classroom atmosphere conducive to participation and sustained engagement.

Across the reviewed literature of human senses, several points are firmly established. First, human perception is inherently multisensory, and learning results from the interaction of sensory, cognitive, and emotional processes (NCERT, 2007; Majid et al., 2018). Vision and hearing have historically occupied a dominant position in Western epistemology and educational practice, particularly in formal schooling, where language learning has relied primarily on audiovisual input. At the same time, recent neuroscientific and linguistic research has demonstrated that so-called "lower" or less privileged senses such as smell, taste, touch, interoception, and vestibular–proprioceptive systems play crucial roles in attention, memory, emotion regulation, and meaning-making (Culeen and Omid, 2021; Olofsson, 2024; Staszko et al., 2020). However, the literature also reveals important areas of contestation. The traditional hierarchical organization of the senses, rooted in Aristotelian and Eurocentric perspectives, has been challenged by cross-linguistic and cross-cultural studies showing that languages and cultures differ in how they categorize and lexicalize sensory experience (Majid and Levinson, 2011). In addition, while cognitive and neuroscientific research supports the integration of multiple sensory channels in learning, educational practice, particularly in EFL contexts, continues to privilege sight and hearing, often marginalizing bodily, affective, and internal sensory dimensions. This tension reflects an unresolved gap between theoretical advances in

embodiment and the persistence of traditional instructional models.

What remains largely unknown is how systematic sensory exploration, beyond the audiovisual channel, functions within EFL classrooms during middle childhood. Specifically, there is limited empirical evidence on how interoception, vestibular–proprioceptive stimulation, taste, smell, and tactile engagement influence learners' emotional, behavioral, and social engagement in foreign language learning. Moreover, few studies have examined how these sensory dimensions interact with language output and classroom participation in naturalistic educational settings. This theoretical framework informs the present study by justifying a multisensory and embodied approach to EFL instruction. By integrating activities that engage interoception, balance, movement, touch, taste, and smell alongside sight and hearing, the study seeks to challenge the historical hierarchization of the senses and explore their pedagogical potential in middle childhood. The framework thus provides the conceptual basis for examining engagement not merely as a cognitive phenomenon, but as an embodied, emotional, and socially situated process mediated through multiple sensory channels.

2.2. Multisensory Teaching Theories

Multisensory teaching emerged from the work of the Association Method (AM) and the Orton–Gillingham (OG) approach, developed in the 1920s, which is recognized as one of the earliest multisensory instructional methods. Mildred Agatha McGinnis, a teacher of students with speech and hearing impairments, and Samuel T. Orton, a neuropathologist, contributed foundational ideas emphasizing the need for multisensory instructional practices, particularly for learners with language disorders and neurodiverse profiles. Their pedagogical approach

combined Orton's therapeutic principles with instruction in phonemes (sounds), morphemes (meanings), and spelling rules, engaging hands, eyes, ears, and voices within a consciously organized system for learning (Henry, 1998, as cited in Morgan, 2019, p. 47). Orton further argued that effective intervention should be educational in nature, integrating early guided instruction with kinesthetic reinforcement (as cited in Morgan, 2019, p. 47).

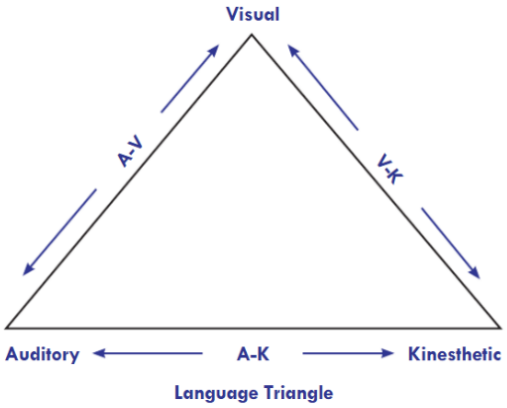
Despite its origins, multisensory teaching continues to be predominantly associated with instructional practices for learners with speech and language disorders, thereby overlooking its broader potential for language learning through the full range of human sensory inputs. As Morgan (2019) observed, "multisensory communication is practiced as a teaching method in language education for children with speech and language disorders" (p. 46).

In educational contexts, a multisensory approach is defined as "a strategy that provides additional pathways for the learner to receive information" (Morgan, 2019, p. 46). Although it was initially designed to support the development of reading, writing, and oral communication in children with speech and hearing impairments, its application within mainstream educational institutions and contemporary methodologies remains limited. Morgan (2019) further reported that multisensory activities help reduce student distraction and extend attention span. When learners engage in multisensory instruction, they are more likely to sustain focus and participation for longer periods, as multiple areas of the brain are simultaneously activated to receive and process information.

The multisensory approach, proposed by Orton-Gillingham, focuses on audio, visual and tactile, using a triangle in order to build the student's language. The Gillingham Manual, originally intended for use with individuals who have difficulty with reading and writing

associated with dyslexia, is currently used to teach phonics for toddlers and preschoolers. (Morgan, 2020, p. 46).

Figure 5 *The Language Triangle from "The Gillingham Manual,"*



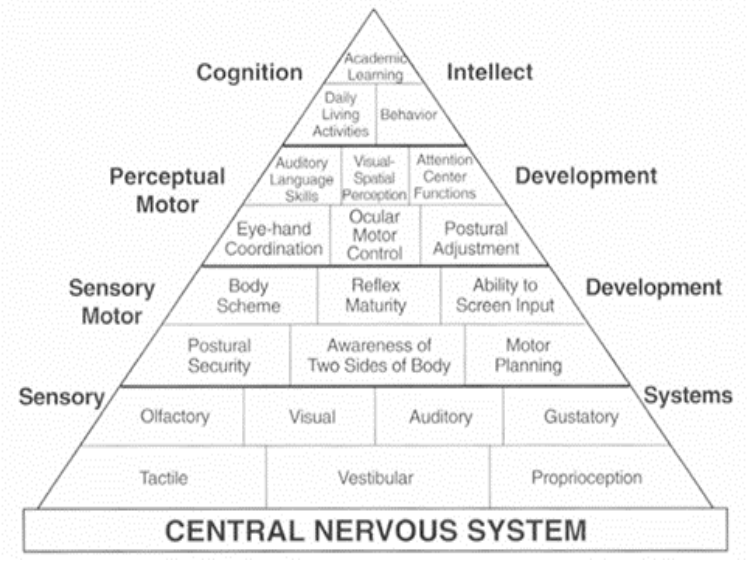
Note: Model produced by Gillingham, A and B.W. Stillman, 1997, Cambridge, MA. Educators Publishing Service, p. 30.

Schmidt and Lee, as cited in Morgan (2019), identified sensory input as the most crucial stage of learning, stating that it constitutes "the foundation of the learning process, and it is when active cognition begins" (p. 46). From this perspective, the instructional goal is to strengthen this initial stage through the use of multiple sensory stimuli within authentic communicative experiences. Although the multisensory teaching approach has traditionally been applied with toddlers, preschool-aged children, and learners with speech and language disorders in language education (Morgan, 2019, p. 46), it represents a pedagogical tool that remains insufficiently explored in elementary education and in English as a foreign language (EFL) contexts. Nevertheless, it holds considerable potential for facilitating learners' exploration of the world through multiple receptive channels.

Teaching through a multisensory approach has been proposed as a means of strengthening neural pathways in the brain, thereby promoting more automatic retrieval of information (Kelly & Phillips, 2016, as cited in Morgan, 2019, p. 46). In contrast to the Gillingham Manual, which prioritizes visual, auditory, and kinesthetic modalities primarily from a fine-motor perspective, Taylor and Trott (as cited in Hannant et al., 2023, p. 168) proposed a pyramid model in which all sensory systems constitute the foundational basis for learning.

Figure 6

Taylor and Trott's Pyramid of Learning (1991)



Note: Cited in Hannant, P et al, (2023). p.168.

Although subsequent approaches such as the Multisensory Approach and the Pyramid of Learning have incorporated kinesthetic and other sensory components into educational practice, the theory of embodied cognition most explicitly links learning with the body by emphasizing the direct role of sensory and motor systems in cognitive processes (Foglia and Wilson, 2013, as

cited in Hannant et al., 2023, p. 168). This theory has been examined across multiple disciplines, including science and education, and challenges the traditional view of the body as a "passive observer to the brain" (Fugate et al., 2018, p. 274). Scholars who support embodied cognition, such as Shapiro (2011), argue that cognition cannot be separated from bodily processes, since knowledge emerges through the dynamic interaction between perception and action.

Although research on embodied cognition is still in its early stages, the multidisciplinary and interdisciplinary nature of this body of literature offers thought-provoking recommendations for enhancing educational practice (Shapiro, 2011, p. 19). From this perspective, cognition is fundamentally shaped by the learner's physical characteristics and sensorimotor experiences.

Embodied cognition encompasses diverse perspectives; however, these approaches share common theoretical foundations. Fugate et al. (2018) identified two central assumptions: (a) cognition involves the body and its interactions with the environment, and (b) these bodily interactions are represented in the brain in a non-abstract manner (e.g., Barsalou, 1999, 2008; Lakoff and Johnson, 1999; Borghi & Caruana, 2015; Shapiro, 2011; L. B. Smith, 2005, as cited in Fugate et al., 2018, p. 275).

Furthermore, even in the absence of physical movement or direct sensory engagement, imagining an action activates neural processes similar to those involved in performing the action. The brain thus processes concepts through sensorimotor simulations. As Leung et al. (2011), cited in Fugate et al. (2018), stated, "abstract concepts are tied to the body's sensory and motor system" (p. 274). Research in cognitive psychology and neuroscience therefore suggests that the body cannot be separated from learning processes, whether its role is direct or indirect. Without

bodily involvement, meaningful learning cannot occur. Nevertheless, Fugate et al. (2018) observed that limited research has examined how students learn most effectively through bodily engagement in structured educational settings, particularly beyond preschool and within academic classroom contexts, as well as how teachers can adapt their instructional practices accordingly (p. 275).

A concept that has gained widespread acceptance among educational institutions, parents, and teachers is that of learning styles. According to Pashler et al. (2008), this notion refers to the belief that individuals differ in the ways they acquire and process information (p. 106). The underlying assumption is that learning becomes more effective and efficient when instruction is adapted to learners' preferred styles. Consequently, numerous assessment instruments have been developed to categorize students based on these presumed preferences.

One of the most influential models is VARK, which proposes four modes of communication: Visual, Aural, Read/Write, and Kinesthetic (Fleming, 1992). Although this model broadened conceptions of learning by acknowledging bodily involvement through the kinesthetic modality and has been widely implemented in educational contexts, it also establishes a hierarchy among sensory channels and excludes additional sensory systems. This hierarchy is reflected in the assertion that "visual, aural, read/write, and kinesthetic are the sensory modalities that are used for learning information" (Fleming, 1992, p. 9). However, empirical evidence has challenged the theoretical and pedagogical validity of learning styles. Pashler et al. (2008) reported that research on human learning, memory, and metacognition over the past two decades demonstrates that individuals' intuitive beliefs about how learning occurs are frequently inaccurate. They concluded that existing literature does not provide sufficient empirical support for the use of

learning-style assessments in educational practice. Instead, these authors emphasized the importance of designing instructional experiences, activities, and challenges that are effective for all learners, rather than tailoring instruction to presume individual learning styles (Pashler et al., 2008).

The preceding theoretical review of multisensory approaches showed that, although the incorporation of the senses into learning theory has evolved since the twentieth century, certain assumptions have been maintained through the hierarchical organization of the senses. In contrast, perspectives such as embodied cognition have contributed to a broader and more complex understanding of sensory channels. Nevertheless, greater implementation of these approaches is still needed in middle childhood populations and in EFL contexts in order to enrich pedagogical practices.

2.3. Engagement and disengagement

Research on student engagement has increased substantially within the fields of education and English as a Foreign Language (EFL) teaching and learning. Contemporary challenges, such as the growing use of technology and digital devices among children, along with emerging social, economic, and educational demands, have generated a need to identify new strategies to sustain students' attention and motivation. Consequently, engagement has come to be understood as a multidimensional construct (Fredricks, 2019, p. 2). Kuh (2003) and Mackenzie (2015) have argued that engaging learners is critical to academic success and that desirable learning outcomes are best achieved through active learning processes that involve sustained student participation (as cited in Thongsongsee, 2022, p. 36). Similarly, Hans (2021), as cited in Thongsongsee (2022), affirmed that language learning achievement depends heavily on student engagement

(p. 37). These authors represent only a small portion of the extensive body of literature advocating for the promotion of engagement in EFL classrooms.

Engagement and multisensory teaching appear to be indirectly related. Although few authors have explicitly linked these constructs, several scholars have emphasized the importance of learners' active participation, which can be associated with embodied learning, that is, learning through the use of the whole body and multiple sensory channels. Carini et al. (2006) reported that students learn more effectively and retain information better when they are actively involved in the learning process (as cited in Thongsongsee, 2022, p. 37).

It is therefore essential to define the concept of engagement. Dictionary definitions provide an initial perspective. *The American Heritage Dictionary of the English Language* defines engagement as being "actively committed" or as "involving oneself or participating actively." Likewise, *The Oxford Dictionary* defines engagement as the ability "to succeed in attracting and keeping somebody's attention and interest," tracing its etymology to the French term *engager*, meaning to commit or to be morally bound. These definitions emphasize behavioral and emotional components. In educational contexts, however, engagement lacks a single, universally accepted definition. Boekaerts (2016), as cited in Thongsongsee (2022), noted that "no universally accepted definition of the term can be extracted, and the issue of a blurred construct persists" (p. 40).

Nevertheless, several scholars have proposed conceptualizations of student engagement. Fredricks (2019) described it as comprising observable or "outward manifestations" of student involvement. Hiver et al. (2021), as cited in Thongsongsee (2022), conceptualized student engagement as the stage at which learners are not only physically present but also mentally

involved in accomplishing language learning tasks.

Student engagement is widely recognized as a complex construct that requires division into components. Fredricks et al. (2004) described engagement as a multidimensional construct organized around behavioral, emotional, and cognitive dimensions (p. 60).

However, Good and Brophy (1987) argued that educational processes should be examined through a multidimensional lens that includes social and interpersonal factors, since relationships and interactions within the classroom play a central role in students' learning experiences. They emphasized that supportive relationships with teachers and peers form the basis for developing approval of both oneself and learning activities, as well as confidence and reduced apathy toward the foreign language. This social dimension is therefore considered in the present study as an additional element for assessing engagement, particularly as reflected in group work, interpersonal interactions, general classroom comments, and individual and collective emotional responses. Social dimension is essential for capturing students' engagement in the proposed activities.

In summary, school engagement has been defined as a complex construct that requires division into three and, according to some authors, four dimensions in order to provide a comprehensive understanding of student involvement in learning.

Aligned with these considerations, several theoretical perspectives complement the conceptualization of engagement. The self-system motivational model proposed by Connell and Wellborn (1991), as cited in Fredricks et al. (2019), is relevant to this study because it explains how classroom conditions such as structure, autonomy support, and teacher involvement influence students' motivation.

These conditions affect how learners perceive themselves in the classroom, particularly in terms of feeling connected, independent, and capable (Skinner et al., 2008, as cited in Fredricks et al., 2019, p. 11).

2.3.1. Behavioral engagement

Behavioral engagement refers to observable student actions and participation in learning activities (Fredricks et al., 2004, as cited in Shelley et al., 2011, p. 2). This construct has been defined in multiple ways. One definition emphasizes positive conduct, including compliance with classroom rules and adherence to social norms (Finn, 1993; Finn, Pannozzo, & Voelkl, 1995; Finn & Rock, 1997, as cited in Fredricks et al., 2004, p. 59). Several scholars have noted that this form of engagement is manifested in behaviors such as completing assigned activities and attending to teachers' instructions.

A second definition focuses on students' involvement in academic tasks and learning processes, encompassing behaviors such as effort, persistence, concentration, attention, asking questions, and contributing to class discussions (Birch & Ladd, 1997; Finn et al., 1995; Skinner & Belmont, 1993, as cited in Fredricks et al., 2004, p. 72). From this perspective, behavioral engagement ranges from basic rule-following and task completion to active participation in classroom interactions.

Because the concept of effort appears in definitions of both cognitive and behavioral engagement, it carries a broad and multifaceted meaning, encompassing regulatory, motivational, and task-oriented dimensions of student involvement.

2.3.2. Cognitive Engagement

As Furlong and Christenson (as cited in Fredricks, 2008) argued, cognitive and affective engagement constitute internal indicators that are less directly observable in classroom contexts. Nevertheless, certain behavioral and attitudinal cues may assist researchers in identifying these dimensions.

Cognitive engagement ranges from surface-level strategies, such as memorization, to the use of self-regulated learning strategies that foster deep understanding. Connell and Wellborn (as cited in Fredricks et al., 2004) identified indicators including flexibility in problem solving, preference for challenging tasks, and adaptive coping in response to failure (p. 64). Cognitive engagement has also been described as a form of intellectual investment characterized by thoughtfulness and a willingness to exert the effort required to comprehend complex ideas and master difficult skills. This construct is reflected in students' interest in learning, goal setting, and self-regulation of performance (Appleton et al., 2006, as cited in Fredricks et al., 2019, p. 28).

Several authors have highlighted specific learning strategies such as rehearsal, summarization, and elaboration that students employ to retain, organize, and understand academic content (Corno and Mandinach, 1983; Weinstein and Mayer, 1986, as cited in Fredricks et al., 2004, p. 64). However, in elementary school contexts, identifying these strategies can be particularly challenging, as learners are still developing skills for managing key concepts and learning materials (e.g., notebooks and textbooks). Although no single theory of cognitive engagement focused exclusively on children has been identified, the use of self-regulated learning behaviors, such as seeking help when necessary, identifying with proposed activities, making connections,

and transferring knowledge to new situations, has become increasingly recognized.

Corno (1993) and Pintrich and De Groot (1990) (as cited in Fredricks et al., 2009) observed that engaged students "manage and control their effort on tasks, for example, by persisting or by suppressing distractions, to sustain their cognitive engagement" (p. 64). This pattern is also observable among children: when they are highly involved in an activity, they tend to minimize distractions, self-regulate their behavior, and even attempt to regulate their peers. Conversely, when commitment is low, students are more likely to engage in off-task behaviors, such as talking to classmates or focusing on external factors (e.g., time).

Importantly, the motivation underlying such regulatory behaviors requires careful analysis. Students may regulate themselves or others for different reasons: because they enjoy the activity (emotional engagement), because they are focused on learning and problem solving (cognitive engagement), or because they aim to comply with rules and instructions (behavioral engagement). Distinguishing among these motives constitutes an area that warrants further empirical investigation. Cognitively engaged students, therefore, employ deliberate problem-solving strategies and anticipate possible scenarios in order to enhance future performance and outcomes; in other words, they act strategically in their learning processes.

2.3.3. Agentic engagement

Agentic engagement refers to students' intentional and proactive efforts to personalize, refine, and actively shape favorable learning conditions (Reeve, 2013, as cited in Fredricks et al., 2019, p. 28). Agentically engaged learners interact collaboratively with the instructional facilitator (i.e., the teacher) by offering input, expressing preferences, making suggestions, and communicating

their interests and desired learning activities. In doing so, they assume an active role in influencing the learning process rather than merely responding to instructional demands.

To strengthen these competencies, satisfy their psychological needs, and obtain greater instructional support, students may exhibit different forms of engagement: effortful participation (behavioral engagement), enthusiasm and positive affect (emotional engagement), strategic and self-regulated learning (cognitive engagement), and proactive involvement in instructional decision-making (agentic engagement). These forms of engagement are not mutually exclusive and may co-occur. For example, students may work both diligently and enthusiastically toward academic goals, thereby integrating behavioral and emotional engagement in their learning experience.

2.3.4. Emotional engagement

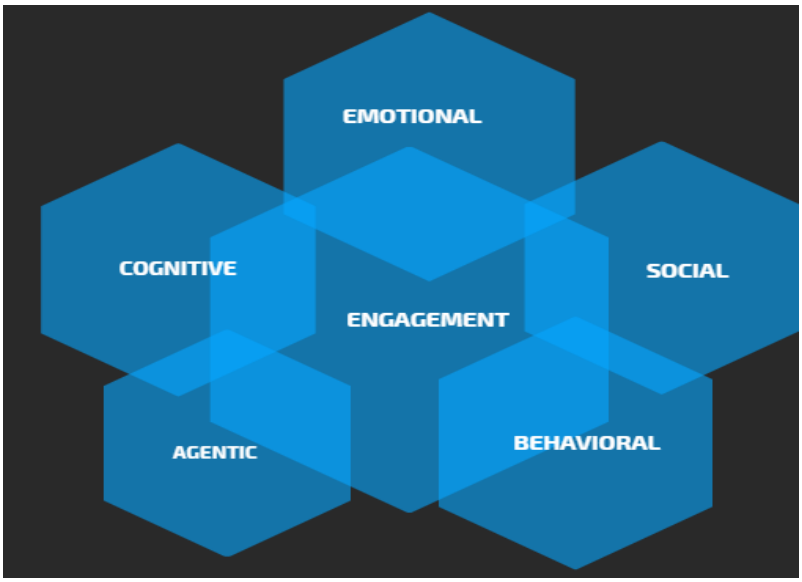
Emotional engagement has been conceptualized as students' affective responses within the classroom, including feelings of interest, boredom, happiness, sadness, and anxiety (Connell & Wellborn, 1991; Skinner and Belmont, 1993, as cited in Fredricks et al., 2004, p. 63). Krapp et al. (1992, as cited in Fredricks et al., 2004) further characterize emotional engagement as a relatively stable motivational orientation that is reflected in students' consistent choices to pursue specific activities or topics of study and in their willingness to undertake challenging tasks (p. 63). In this sense, emotional engagement encompasses both positive and negative reactions to instructional activities, peers, teachers, and classroom contexts.

The relevance of emotional engagement is particularly salient during middle childhood. Mah and

Ford-Jones (2012) emphasize that "physical activity through middle childhood plays an integral role in instilling self-confidence and in providing a conduit for learning" (p. 82). This perspective underscores the close relationship between emotional experience, bodily activity, and learning processes at this developmental stage, suggesting that emotionally supportive and physically engaging learning environments may enhance students' motivation and participation in academic tasks. In relation to the current study, it suggests that incorporating embodied and multisensory practices into EFL instruction may contribute to more positive emotional experiences with English and counteract students' disengagement from the subject.

Figure 7

The construct of Student Engagement



Note: Own elaboration based on the model proposed by Fredricks et al. (2009).

Early research frequently conceptualized disengagement as merely the absence of engagement, assuming that both constructs existed along a single continuum.

However, more recent studies have demonstrated that engagement and disengagement represent distinct patterns of behavior and experience and that they differentially predict students' academic outcomes and classroom behaviors. Skinner et al. (2008) documented differential associations between engagement (e.g., effort, interest) and disaffection (e.g., withdrawal, boredom). In this regard, Fredricks et al. (2019) define disengagement as the actions students undertake to avoid or withdraw from learning activities (p. 135). Disengagement is further theorized as a multidimensional construct comprising behavioral, emotional, and cognitive components (Skinner et al., 2008; Wang et al., 2017, as cited in Fredricks et al., 2019, p. 53).

Disengaged students exhibit a range of observable characteristics. Piirto (2011, as cited in Setiawan, 2019) identifies disengagement through behaviors such as unresponsiveness, lack of interest, distractibility, and frequent off-task conduct (p. 27). Additional manifestations include minimal participation and effort, classroom disruption, emotional withdrawal, superficial learning strategies, and limited investment in academic content (Fredricks et al., 2019, p. 10). These findings suggest that disengaged students often appear indifferent or discouraged and tend to complete only the minimum requirements. Moreover, longitudinal research indicates that disengagement increases as students advance through school, with the most pronounced decline occurring during the transition from elementary to middle school (Benner and Graham, 2009, p. 11). This pattern is observable in the present context, where some fourth-grade students have begun to show shifts in their attitudes toward classes, instructional materials, and pedagogical approaches.

The literature identifies distinct profiles of disengagement. These include behaviorally disengaged students, emotionally disengaged students, and those who exhibit both cognitive and emotional disengagement. Behavioral disengagement refers to patterns such as being off-task, avoiding effort, and withdrawing quickly from learning activities (Jang et al., 2016, as cited in Thongsongsee, 2022, p. 38). Such students may demonstrate difficulty sustaining attention or engage in disruptive classroom behaviors. They typically avoid tasks, procrastinate, exert minimal effort, and abandon tasks when faced with confusion or challenge (Fredricks et al., 2019, p. 137).

Emotional disengagement is characterized by boredom, lack of interest, and the presence of negative affective states such as sadness, anxiety, and frustration (Skinner et al., 2009, p. 69). These emotional responses can lead to alienation from both academic tasks and social relationships. Negative emotions are known to impair academic achievement by reducing motivation and increasing task-irrelevant thinking (Pekrun, 2007, p. 26). At the elementary level, emotional disengagement is often linked to disrupted relationships with peers or teachers. Research suggests that students who fail to establish meaningful connections with adults and classmates are more likely to experience emotional disengagement (Furrer et al., 2014; Juvonen et al., 2012, as cited in Fredricks et al., 2019, p. 69).

Cognitive disengagement refers to reliance on unplanned, disorganized, and surface-level strategies, such as completing tasks without deliberate planning or reflection. Another related profile includes students who appear behaviorally engaged while simultaneously exhibiting cognitive and emotional disengagement.

These students describe their school participation as "doing the bare minimum," "mindlessly taking notes," or merely "going through the motions" (Jiménez-Aleixandre et al., 2000; Pope, 2001, as cited in Fredricks et al., 2019, p. 71). Although such students complete assigned work, their engagement remains superficial, relying on rote memorization rather than deeper learning processes. Consequently, they often report limited comprehension and poor retention of content (Fredricks et al., 2019, p. 71).

Reeve (2013, as cited in Fredricks et al., 2019) introduces an additional dimension termed agentic disengagement, which refers to passively accepting instruction without contributing input or attempting to personalize learning activities (p. 137). Agentically disengaged students comply with tasks but do not negotiate meaning, express preferences, or align learning with personal goals. This construct closely parallels the profile of cognitively and emotionally disengaged students described by other scholars (Duschl, 2000; Pope, 2001). For this reason, the present study subsumes agentic disengagement under the broader category of cognitive and emotional disengagement.

Collectively, these perspectives indicate that students may withdraw behaviorally, experience emotional depletion, engage superficially at a cognitive level, or participate passively, and that these patterns may co-occur. Fredricks et al. (2019) situate disengagement within self-determination theory (Ryan and Deci, 2017), particularly the dual-process model (Bartholomew et al., 2011; Vansteenkiste and Ryan, 2013, as cited in Fredricks et al., 2019, p. 135). This framework posits that all students possess three universal psychological needs: autonomy (a sense of volition and personal endorsement), competence (a perception of effectiveness

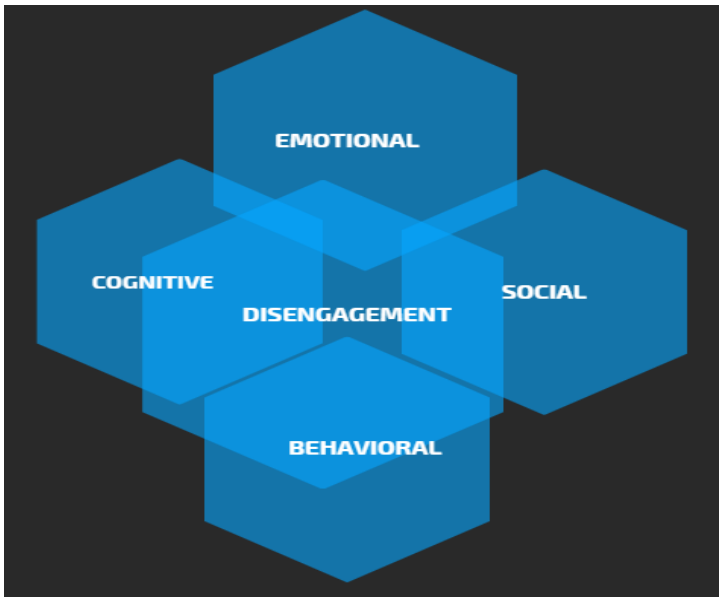
and growth), and relatedness (experiencing warm and supportive social connections) (Fredricks et al., 2019, p. 138). Frustration of these needs is associated with increased disengagement (Jang et al., 2016, as cited in Fredricks et al., 2019). The term *universal* indicates that these needs could be inherent in learners (Fredricks et al., 2019, p. 135).

Empirical research further indicates that disengagement is more prevalent among male students, in urban school contexts, and among learners from ethnic minority groups and lower socioeconomic backgrounds (Baliánz et al., 2007; Johnson et al., 2001; Li and Lerner, 2011, as cited in Fredricks, 2009, p. 10). In contrast, no theoretical framework addressing engagement or disengagement in female students was identified.

While current multisensory and engagement-oriented approaches provide teachers with valuable tools for interpreting students' behavioral, emotional, and cognitive processes, important tensions remain between their theoretical promise and their systematic application in classroom practice. Existing frameworks tend to privilege certain sensory modalities while marginalizing others and offer limited guidance on how embodied student responses can be interpreted as pedagogical indicators. The present study addresses these gaps by proposing that multisensory engagement cues be used as analytical resources for refining instructional practice. By examining patterns of participation, affect, and interaction across sensory modalities, this study contributes to a more contextualized understanding of learning and to the identification of factors associated with disengagement in specific educational settings.

Figure 8

The construct of Student Disengagement



Note: Own elaboration based on the theory proposed by Fredricks et al. (2009).

2.3.5. Engagement and teaching

In recent decades, research on student engagement in English as a Foreign Language (EFL) context has increased considerably (Firdaus and Fatimah, 2021; Mackenzie, 2015; Yusuk, 2020, as cited in Simatupang et al., 2024). This growing scholarly interest can be explained by the recognition that engagement is a malleable construct shaped through the interaction between individuals and their learning environments. As proposed by Fredricks et al. (2004), engagement emerges from the dynamic relationship between the learner and the context and is responsive to variations in instructional settings (Connell, 1990; Finn and Rock, 1997, as cited in Fredricks et al., 2004, p. 82).

Student engagement is closely associated with teachers' instructional practices. Cothran and Ennis (2000, as cited in Thongsongsee, 2022) argue that teachers mediate, or "build the bridge," to student engagement (p. 38). In this sense, the ways in which teachers design and implement classroom activities have a direct influence on students' levels of engagement. Teachers' pedagogical decisions can shape students' opportunities for participation and their perceptions of learning experiences (Skinner and Belmont, 1993, as cited in Thongsongsee, 2022, p. 37).

Within the literature, certain variables have been identified as either indicators or facilitators of engagement. Indicators typically manifest as signs of disengagement. In the present context, such indicators were observed prior to the implementation of multisensory sessions, including students' comments regarding the repetitive use of English texts and the limited variety of classroom activities associated with these materials. In contrast, facilitators of engagement function as mechanisms for designing assessment and intervention strategies that enhance students' connections within the school environment (Christenson et al., 2008; O'Farrell et al., 2006, as cited in Fredricks, 2019, p. 229).

Longitudinal research has shown that students tend to become increasingly disengaged as they advance through the school system, with the most pronounced declines occurring during the transition from elementary to middle school (Wigfield et al., 2015, as cited in Fredricks et al., 2019, p. 10). This trend has prompted educators to seek instructional approaches that sustain engagement during critical developmental periods.

Although engagement and multisensory instruction are not inherently equivalent constructs, several scholars emphasize the role of sensory experience and teacher mediation as influential factors in EFL engagement (Majid, 2018; Pishghadam et al., 2024). These perspectives underscore the importance of the teacher as a central agent in shaping learning conditions that promote active participation. Consequently, the manner in which EFL teachers organize and conduct their lessons plays a significant role in determining students' levels of engagement.

While current multisensory and engagement-oriented strategies offer teachers valuable tools for understanding students' behavioral, emotional, and learning processes, important tensions remain between their theoretical potential and their systematic implementation in classroom practice. In particular, existing approaches tend to privilege certain sensory channels while overlooking others. This study addresses these gaps by proposing that teachers use multisensory engagement cues as analytical resources to refine their pedagogical practices. By attending to students' patterns of participation, affect, and interaction across sensory modalities, the study contributes to a more contextualized understanding of learning and to the identification of factors that generate disengagement within specific educational settings.

2.5. Middle Childhood Theory

Middle childhood spans the period between early childhood and puberty, approximately from 6 to 11 years of age. Although children's behavior and cognitive development are influenced by multiple contextual factors, certain general characteristics can be identified

according to age. Mah and Ford-Jones (2012). However, theoretical and empirical research on middle childhood (7–11 years) remains limited. Mah and Ford-Jones (2012) refer to this stage as the "forgotten years" of development because most research has traditionally focused on early childhood or adolescence (p. 1). Only a small number of theorists, such as Jean Piaget, explicitly addressed this age group. Piaget classified children between 7 and 11 years old within the concrete operational stage, during which "children develop rational thinking abilities, although their thinking remains tied to concrete objects" (as cited in Farida et al., 2022, p. 58). Nevertheless, Piaget's theory has been criticized for overlooking cultural and social interaction factors in cognitive development (Farida et al., 2022, p. 55). This limited attention to middle childhood may partly explain the scarcity of research examining the transition from early childhood to middle childhood in relation to EFL learning and engagement.

Piaget's theory also emphasized the relevance of sensory systems in early development. In his four-stage model, learning begins in the sensorimotor stage, during which children construct knowledge through sensory experiences (as cited in Hannant et al., 2023, p. 168). Although sensory exploration is central during early childhood, it does not disappear in later stages. Rather, sensory engagement continues to play a role throughout development. As Mah and Ford-Jones (2012) explain, "there are many changes that occur as children navigate the intricate path from preschooler to adolescent, changes that are integral to their overall development" (p. 81). During this period, children become physically stronger and more coordinated, while also developing greater emotional awareness and more abstract cognitive processes (Mah and Ford-Jones, 2012, p. 81). Teachers, who spend considerable time with learners at this stage,

should therefore remain attentive to these developmental changes and consider how different subjects can support both physical and cognitive growth. As suggested by Piaget and Mah and Ford-Jones (2012), such growth may benefit from continuous stimulation. Indeed, the authors described middle childhood as "a time rich in potential that is just waiting to be cultivated" (p. 81).

Neuroscientific research further supports the importance of this stage. Knudsen (2004, as cited in Mah and Ford-Jones, 2012) characterizes middle childhood as a "sensitive period" due to the role of experience in brain development. During this time, myelination increases within the corpus callosum and subcortical areas, while cortical gray matter undergoes adaptation. Younger children show diffuse patterns of neural activation, whereas older children display more selective regional activation as a result of synaptic pruning (Mah and Ford-Jones, 2012, p. 81). Kandice (as cited in Mah and Ford-Jones, 2012) also highlights the importance of movement during this stage, noting that children's increasing physical abilities parallel neural reorganization (p. 82). This underscores the need to provide learning environments that promote motor activity and sensory stimulation, supporting both motor development and synaptic remodeling. As Mah and Ford-Jones (2012) state, "Getting children in motion gives them a sense of accomplishment, resiliency, and security" (p. 82).

Language development also undergoes significant changes during middle childhood. Neural consolidation related to language, social skills, and cognition intensifies at this stage. Mah and Ford-Jones (2012) argue that this period represents "the best time to expose children to an array of experiences which can strengthen the number and precision of these connections and

enhance their cognitive abilities and language capacity" (p. 82). Consequently, middle childhood constitutes an optimal stage for fostering bilingual development. Hosenfeld (1978, as cited in Jiménez et al., 1995) suggested that bilingualism may enhance children's capacity for conscious reflection, reporting that students who speak both languages fluently demonstrate cognitive advantages (p. 93).

From a pedagogical perspective, Piaget's theory (1952, as cited in Huitt, 2003) recommends that teachers employ a wide range of concrete experiences to facilitate learning (p. 2). This reinforces the relevance of multisensory activities and engagement-oriented approaches in EFL instruction for middle childhood learners. Mah and Ford-Jones's (2012) findings further indicate that when children participate in stimulating experiences that support their individual talents and skills, they are more likely to reach their full potential.

Middle childhood also presented distinctive behavioral characteristics that must be considered in educational practice. Unlike adults, children tend to be enthusiastic and communicative but may also lose concentration and motivation easily (Moon, 2000, as cited in Gürsoy, 2010, p. 165). Therefore, the challenge for educators is to design environments and learning experiences that continuously stimulate both mind and body. As Mah and Ford-Jones (2012) conclude, the goal is to establish conditions that foster sustained engagement and provide a strong developmental foundation for later stages of life (p. 82).

2.6. Multiple Intelligences

Gardner transformed the field of education when he published Frames of Mind: The Theory of Multiple Intelligences (1983). In this book, he described a new way of thinking about

human intelligence, challenging the traditional view that there is one kind of intelligence standardized tests can measure (Strauss, 2013 cited in Morgan, H, 2021, p,125). However, this perspective found different authors who objected to his definition of intelligence, which for them, they should be called abilities or skills and, all human beings should have a general intelligence. According to Gardner, intelligence involves a person's ability to solve a problem or do something considered valuable in one or more cultures. In the early 1980s, he identified seven intelligences and about a decade later added an eighth. Howard Gardner studied intelligence by looking at kids who were exceptionally good at different things. He determined these eight intelligences based on psychometric data and particular developmental histories. (Gardner, 1983).

2.6.1. Linguistic Intelligence

The first intelligence is called linguistic intelligence. It is the closest to EFL since "people with strong linguistic skills can use their native language, and sometimes other languages, to understand people and express their thoughts" (Morgan, H, 2021, p.127). Nevertheless, Gardner affirmed that language addresses more intelligences. "Syntax and phonology lie close to the core of linguistic intelligence while semantics and pragmatics include inputs from other intelligences (such as logical-mathematical and personal intelligences" (Gardner, H, 1983, p.85). In the same way, literate people are not the only ones who may have linguistic intelligence. "E. F Dube's recent finding showed that illiterate Africans were more successful at remembering stories than either schooled Africans or schooled New Yorkers" (p.97).

This could be seen as another form of linguistic intelligence. Gardner reminds us of the importance of seeing language as a communicative tool, its beginnings are in the vocal tract and the need to give messages, transmitted through gesture, voice and writing. This statement aligns with Krashen's claim (cited by Liu, 2022) regarding language acquisition occurring primarily through communicative means, as he asserted that "to acquire the language, learners should pay more attention to meaning than to form" (p. 475). This approach highlights the need to prioritize meaning over form by allowing students to explore their real contexts through their sensory channels, rather than centering instruction exclusively on grammatical rules.

In this sense, if human beings learn through different types of intelligences and channels, it is important to highlight in this research a linguistic approach oriented more toward second language acquisition (SLA) than toward language learning. As Krashen states, learning "refers to conscious knowledge of a second language, knowing the rules, being aware of them, and being able to talk about them" (1982, p. 10). Therefore, it can be inferred that highly abstract approaches to language instruction may be less suitable for middle-childhood learners, who, as previously discussed, tend to benefit more from concrete experiences and sustained interaction with input. This does not imply that learning as a conscious process is unnecessary; rather, it suggests that, at this developmental stage, learning is more effective when supported by experiential and meaningful engagement. In this sense, instruction may align more closely with acquisition, understood as "the process of transforming input into output, in which interaction is an effective approach for receiving input and producing output" (as cited in Liu, 2022, p. 474).

Regarding the age of the sample for this research, Krashen asserts that "older children

acquire faster than younger children, if time and exposure are kept constant" (1984, p. 43) because they are able to process input that is comparatively simpler for them. This reinforces Krashen's position that what matters most in second language acquisition is the provision of comprehensible input rather than age itself (Krashen, 1984, p. 44). However, it should be understood in relation to other influential factors such as motivation, interaction, emotional conditions, and instructional context, rather than as a single determining variable (Krashen, 1984, p. 44).

To conclude this theoretical section on linguistic intelligence, it is important to emphasize that just as some students find reading and writing in the foreign language easier than oral production, others may feel less confident to talk until they have developed greater expertise, while some begin to use the target language very early. In other words, the duration of the silent period varies among learners and cannot be rushed, as the brain requires time to build an internal system from the input (Krashen, 1982, p.74). Likewise, they need to draw on all the neural and linguistic strategies available to them in order to comprehend and express the input they receive through their senses. "People with strong linguistic skills can use their native language, and sometimes other languages, to understand people and express their thoughts" (Morgan, 2021, p. 127). For these reasons, in the sessions of this study, the use of the mother tongue will not be prohibited, nor will pressure be placed on students to produce constant output in the target Language.

2.6.2. Musical intelligence

"People with enhanced musical intelligence have a heightened ability to hear, recognize, and remember patterns and emerge earlier than other intelligences." (Morgan, H, 2021, p.127).

It needs mainly the auditory sense. Most central elements are pitch (or melody) and rhythm. Nevertheless, people with auditory diseases or deaf have found different alternatives to enjoy music (through movements, maths, colors, feeling it, etc.).

Gardner delves into the early years of life where children begin their musical understanding through nursery rhymes and songs. However, he mentioned that over the years, his learning has been lost in most cases because music occupies a relatively low niche in our culture, so musical illiteracy is acceptable. (p. 116). In the context of English as a foreign language learning, these characteristics are particularly relevant because language also depends on the recognition of patterns, such as intonation, stress, rhythm, and pronunciation. Songs, chants, and rhymes provide auditory input while simultaneously engaging bodily movement and emotional response, allowing learners to associate linguistic forms with sensory experience. Gardner highlights that children's early musical understanding develops through nursery rhymes and songs; nevertheless, this learning tends to diminish over time because music occupies a marginal position in many educational systems, where musical illiteracy is often considered acceptable (p. 116). These variations are also culturally shaped, as music holds different levels of value across societies.

From an EFL perspective, integrating musical and sensory experiences into language instruction may support pronunciation, memory, and motivation by activating auditory,

kinesthetic, and emotional processes simultaneously. Music has historically influenced both individuals and educational practices, and its pedagogical use in language classrooms can help transform linguistic input into more meaningful and embodied experiences, particularly for learners whose strengths lie in sensory and rhythmic perception.

2.6.3. Mathematical intelligence

The third intelligence is mathematical. It is characterized because individuals possess the capability to handle and to have above average logical-mathematical skills also because of their knowledge of causal systems. (Morgan, 2021. p. 127) Gardner agreed with Piaget's concrete operational-stage (roughly the ages of seven to ten), whether mental or physical, are limited to tangible items that are manipulable at the very least, that's why Piaget calls them "concrete" operations which refer to concrete actions such as cooking recipes; playing marbles, balls, cards. "The actions just described may be and, at first, generally are performed physically upon the material world: that is, similarly, other elementary forms of logical-mathematical intelligence; for example, the child's initial appreciation of causal relations and his first efforts to classify objects consistently are also manifested at first through observation and manipulation of physical objects". (Gardner, 1983, p. 139).

2.6.4. Spatial Intelligence

Spatial intelligence involves the skills individuals use to represent and manipulate the spatial world. People with strong spatial intelligence often pursue careers as painters, sculptors, or architects. It is also frequently applied in certain sciences, such as anatomy and topology

(Morgan, 2021, p. 127). Although spatial intelligence is closely associated with vision, since it often develops through observation of the visual world other senses can also contribute to its development. Like linguistic intelligence, spatial intelligence is not confined to a single sensory channel; it can develop in individuals who are blind, indicating that spatial understanding can be achieved through alternative sensory pathways.

Furthermore, "only during the formal operational era, at the time of adolescence, can youth deal with the idea of abstract spaces or with formal rules governing space. This variety of spatial intelligence is still restricted to concrete situations and events" (Gardner, 2011, p. 189). Nonetheless, these tangible activities mark a significant turning point in a child's cognitive development. At this stage, children can manipulate objects and images in the spatial domain more actively and can understand how things appear to someone located elsewhere, thanks to reversible cognitive processes. Spatial skills are evident across all human cultures. While specific innovations such as geometry, physics, kinetic sculpture, or impressionist painting may be unique to particular societies, the ability to navigate complex environments, participate in arts and crafts, and engage in diverse activities appears to be universal (Gardner, 2011, p. 211). In the context of English as a foreign language learning, this universality suggests that spatial intelligence can be harnessed through multisensory classroom activities. By incorporating visual, kinesthetic, and tactile experiences—such as mapping vocabulary, manipulating objects, or enacting dialogues learners can strengthen their understanding and retention of language, linking abstract linguistic concepts to concrete, embodied experiences.

2.6.5. Bodily- Kinesthetic Intelligence

Bodily-kinesthetic intelligence centers on one's internal awareness and is expressed through the controlled use of one's body (Gardner, 1983, p. 249). This intelligence relates to the ability to use the whole body or specific body parts to create something, solve a problem, or display skill through bodily movement (Morgan, 2021, p. 127). In recent cultural traditions, the physical activities of our nature, as represented by the body, and the activities of reasoning have been drastically separated. The cultural tendency to separate mental and physical processes has frequently resulted in undervaluing bodily activity, treating it as less sophisticated or less central than intellectual problem-solving performed with language, logic, or symbolic reasoning. Bodily-kinesthetic intelligence is closely linked to other intelligences and manifests in performing arts, physical activities, athletic practices, creative experimentation, and other ways of engaging the body as a tool. Gardner (1983) further explains: "Paradoxically, whereas the cortex serves as the 'highest' center in most forms of human activity, it is the relatively lowly basal ganglia and the cerebellum that contain the most abstract and complex forms of 'representation of movements'; the motor cortex is more directly tied to the spinal cord and the actual execution of specific muscular movements" (p. 222).

Gardner's concept of bodily-kinesthetic intelligence highlights the importance of using the body as a tool for learning and problem-solving (Gardner, 1983). In the context of English as a foreign language (EFL), this intelligence can be leveraged to enhance learners' engagement and comprehension through movement, gesture, and hands-on activities. By incorporating sensory-rich experiences such as acting out vocabulary, using gestures to reinforce grammatical structures, or engaging in role-plays, teachers can connect language input to students' bodily

awareness. This approach aligns with principles of embodied cognition, which posit that learning is grounded in sensorimotor experience, and it provides alternative pathways for students to internalize linguistic structures, particularly for those who thrive in kinesthetic or multisensory learning environments. Ultimately, integrating bodily-kinesthetic strategies in EFL classrooms supports both comprehension and retention by linking abstract language forms to concrete physical and sensory experiences.

2.6.6. Intrapersonal and interpersonal intelligence

This intelligence refers to the capacity to discriminate between feelings of pleasure and pain and, on the basis of this distinction, to become more involved in or to withdraw from particular situations. Howard Gardner defined it as "the development of the internal aspects of a person" (Gardner, 2011, p. 250). He further noted that this intelligence extends outward, insofar as the ability to observe and differentiate among others particularly with respect to their moods, temperaments, motivations, and intentions constitutes its fundamental skill.

Interpersonal intelligence is especially salient in professions that rely on social influence and care, such as politics, religious leadership, and helping professions including teaching and therapy. Gardner linked interpersonal and intrapersonal intelligence, asserting that "under ordinary circumstances, neither form of intelligence can develop without the other" (Gardner, 1983, p. 255). He employed the term sense of self to describe the balance achieved by individuals and cultures between the promptings of "inner feelings" and the pressures exerted by "other persons" (Gardner, 1983, p. 256). These two forms of intelligence represent capacities that all human beings have the potential to develop and integrate.

Gardner further warned that the absence of an attachment bond can have devastating consequences for normal development, both in the present and across subsequent generations (Gardner, 1983, p. 257). Gardner (1983) also described significant changes occurring during middle childhood, including increasing social sensitivity, a more refined understanding of others' motivations, and a clearer awareness of one's own competencies and limitations. He observed that children become more deeply invested in friendships and often exert considerable effort to maintain close relationships, such that the loss of valued peers can be experienced as particularly painful. Substantial energy is devoted to securing one's position within peer networks, which may be informally structured or, in some cases, resemble rigid hierarchical systems. Inclusion in these groups is associated with positive emotional experiences, whereas exclusion or marginal status may result in feelings of discouragement and isolation. During this stage, children may also develop premature judgments of inadequacy or unrealistic perceptions of their own efficacy, particularly in academic domains such as mathematics or foreign language learning (Gardner, 1983, p. 264).

2.6.7. Naturalist Intelligence

The naturalist intelligence was incorporated later as an extension of the original seven intelligences. It refers to an individual's capacity to recognize, differentiate, and classify living organisms and elements of the natural world. According to Morgan (2021), individuals with well-developed naturalist intelligence tend to demonstrate proficiency in identifying and categorizing plants, animals, minerals, and other features of the environment, such as rocks and grass (p. 127). This form of intelligence is closely associated with exploration of the natural

world and involves the integration of multiple sensory systems, including proprioception, vestibular perception, touch, vision, olfaction, and interoception. In this sense, naturalist intelligence reflects the embodied relationship between the individual and the surrounding environment.

In conclusion, with respect to multiple intelligences and developmental processes during middle childhood, it is important to emphasize that the extent to which these intelligences develop is largely shaped by the experiences children encounter. Consequently, children are more likely to reach their full potential when they are provided with enriching environments, meaningful learning opportunities, and social interactions that support and foster their diverse abilities and capacities, as originally proposed within the framework of Multiple Intelligences by Howard Gardner.

Gardner's theory of Multiple Intelligences expanded traditional views of cognition by recognizing diverse forms of knowing, including bodily-kinesthetic, interpersonal, intrapersonal, and naturalist intelligences. However, a key tension emerges in educational practice when these intelligences are interpreted as discrete learner categories rather than as capacities that can be activated through instructional design. Although the theory acknowledges the importance of sensory and bodily involvement in learning, it does not provide a systematic pedagogical model for integrating multiple sensory channels simultaneously within classroom instruction.

A notable gap in literature concerns the limited empirical exploration of how multisensory teaching can operationalize Multiple Intelligences beyond identification or classification of learners. Most applications of the theory have emphasized matching instruction to presumed

dominant intelligences, rather than examining how coordinated sensory input (e.g., visual, auditory, tactile, and kinesthetic) can stimulate several intelligences concurrently in authentic learning tasks, particularly in elementary foreign language education.

This study addresses these limitations by positioning the multisensory approach as a pedagogical mechanism for enacting Howard Gardner's framework in classroom practice. Rather than treating intelligences as fixed learner traits, the study conceptualizes them as dynamic potentials that can be fostered through structured multisensory experiences. In doing so, it contributes to a more integrative understanding of how Multiple Intelligences may be activated through embodied and sensory-based instruction, extending their application beyond diagnostic use toward instructional innovation in elementary EFL contexts.

Chapter 3 Research Design

This chapter outlines the methodology applied in conducting this research. This section presents the research paradigm and approach, the role of the researcher, the study setting and participants, as well as the procedures for data collection and the instruments employed for that purpose.

3.1. Research paradigm

This research is grounded in the postmodernist paradigm, understood as a framework for questioning reality and representation, and serves as a critique of current methods and evaluation practices. As Kuznar (2008) affirms, postmodernism provides "a general critique of Western institutions and knowledge" (p. 78). Current objectives of the Common European Framework of

Reference for Languages (CEFR) in EFL focus on establishing standards in reading, writing, listening, and speaking, primarily around academic topics. These standards emphasize literacy over embodied learning, often overlooking the importance of prioritizing understanding and communicative assertiveness before linguistic perfection. In a socially and culturally diverse world, English manifests in a wide variety of forms and pronunciations. By enforcing rigid standards, this framework restricts the teaching and learning of the language, promoting a singular perception of English, limiting students' linguistic creativity, and encouraging learning that relies exclusively on cognitive processes while neglecting bodily engagement. This approach fosters disenchantment and precludes the possibility of fully experiential knowledge.

This study followed a qualitative research design, conducted in a naturalistic setting and informed by both literature review and contextual professional experience (Hernández, Fernández and Baptista, 2014, p. 361). Data collection and analysis were guided by the postmodernist paradigm, avoiding the search for a single truth, as positivist approaches often do. Instead, by employing diverse instruments, the study contrasted multiple perspectives during multisensory sessions, which were subsequently interconnected to consider all participants' experiences and interpretations.

Data collection methods aligned with qualitative research principles, prioritizing participants' voices through video recordings, diaries, and open-ended questionnaires. Quantitative measures of student progress in the foreign language were not emphasized; instead, the study valued students' participation and engagement in activities over performance in standard textbook exercises. The researcher played an active role in the process, documenting experiences in each multisensory session through personal diaries, which enriched other instruments by providing

narratives that captured cultural or context-specific aspects influencing each session. To minimize bias, the study considered criteria such as student interactions, observable changes in individual students compared to usual English classes, gestures and emotional expressions, frequency of participation, and the use of English during activities.

3.2. Research approach

This research, as presented, employed a qualitative descriptive approach, aiming to address the 'what,' 'why,' and 'how' of participants' experiences and the teacher's role in fostering engagement and implementing multisensory activities. Qualitative descriptive research involves a level of analysis in which the depth of interpretation is guided by the need to answer the research question consistently. In this study, it was necessary to provide a detailed description of the data obtained from observations of recorded classes and transcriptions, all framed within the theory of engagement and disengagement. This approach allowed for an understanding of how the intensification of the senses occurs in students' engagement in English classes.

Moreover, "qualitative descriptive design borrows methods from other qualitative traditions, offering much flexibility in its methods" (Villamín et al., 2024, p. 5182). This flexibility enabled the analysis and triangulation of descriptive components—student questionnaires, transcriptions, and video recordings—together with the teacher's perception as both researcher and active participant, as reflected in the field journal. As noted by other scholars, "with proper justification of choices throughout the study, pragmatism allows researchers to choose methods that answer the research questions while staying close to the participants' descriptions" (Doyle et al., 2020; Neergaard et al., 2009, as cited in Villamín et al., 2024, p. 5183).

Findings from a well-conducted qualitative descriptive study provide a thorough summary of an event, clarifying its significance for participants (Sandelowski, 2000, as cited in Villamín et al., 2024, p. 5182). Considering that the context possessed specific characteristics influenced by external factors identified by middle childhood theory across social, cognitive, physical, and psychological domains, it was essential to emphasize that the environment was entirely natural, allowing children to express themselves in both their native and foreign languages. Consequently, it was necessary to take a reflective pause prior to analysis to identify and employ the most suitable tools that ensured a high degree of objectivity in interpreting the data.

A qualitative descriptive design is generally consistent with naturalistic inquiry, allowing researchers to examine phenomena, events, or experiences as they naturally occur while remaining within the specific context of the study. Implementing a qualitative descriptive analysis of the instruments made it possible to address the research question and objectives within the framework of engagement theory and the multisensory approach. This process fostered a dialogue between descriptive data and the perceptions recorded by the teacher-researcher in the field journals. The adaptable nature of this design allowed for the incorporation of certain features from other qualitative methodologies (Villamín et al., 2024, p. 5183).

3.2.1. Data Analysis procedures

Data analysis is defined as the systematic process of organizing, examining, and interpreting information to address research questions by identifying patterns, meanings, and relationships (Creswell and Creswell, 2018). In this study, a qualitative descriptive approach was adopted, utilizing descriptive statistics to supplement the primary qualitative analysis of video

recordings, transcriptions, and a researcher's diary. This integration provided a comprehensive view of both recurring trends and nuanced classroom behaviors.

Two complementary analytical procedures were employed. First, descriptive quantitative analysis was used to determine the frequencies and distributions of student responses to the questionnaire. This method focuses on summarizing numerical data through percentages to describe patterns within a specific group (Field, 2018). This procedure was selected because the questionnaire generated structured data that required numerical organization to identify the most frequent tendencies in student perceptions and their reactions to the implemented activities (Field, 2018).

Second, qualitative analysis was applied to the video recordings, transcriptions, and personal diary entries. This procedure involved identifying recurring patterns, actions, and meanings through systematic coding and categorization (Miles et al., 2014). Together, these procedures allowed for a numerical mapping of engagement tendencies alongside an interpretative understanding of the underlying classroom processes.

The use of qualitative analysis was further justified by the narrative and observational nature of the primary instruments. Video recordings and transcriptions captured the complexity of verbal and non-verbal interactions, while the personal diary documented pedagogical reflections and classroom dynamics. Consequently, a qualitative lens was essential to explore the meanings and behaviors that cannot be fully captured by numerical reduction alone (Braun and Clarke, 2021).

3.2.2. Ethical Considerations

The descriptive analysis provided a more objective perspective from the researcher, who simultaneously assumed an active role in the study. This research design enabled the researcher to present a systematic account of the events while minimizing the influence of subjective interpretations on the analysis of categories. Rather than distorting the findings, this approach contributed to enriching the analysis within a theoretical framework. Maintaining proximity to participants' detailed accounts enhances the value of this design, particularly when the study aims to capture first-hand experiences. Neergaard et al. (2009, as cited in Villamín et al., 2024) The use of multiple data collection instruments allowed the study to focus on describing the events that occurred during the sessions while also incorporating the perceptions and situations directly experienced by the teacher-researcher and documented in the instrument referred to as *the personal diary.*

Based on the findings established in the theoretical framework, the teacher-researcher implemented pedagogical strategies such as providing constant input in a low-anxiety environment and using both collaborative and individual activities to promote peer learning. These strategies were intended to strengthen the initial stage of learning through multisensory stimuli and authentic communicative experiences. Pressure on students to produce output in the foreign language was deliberately avoided; instead, spontaneous communication was encouraged, allowing learners to explore or refrain from participation according to their sensory preferences and individual strengths. To minimize the impact of the teacher–student power relationship, participation was voluntary and did not affect students' grades or classroom

evaluation.

Regarding data management, and given that the participants were children, informed consent was obtained from parents prior to the implementation of the study. Parents were essential in authorizing students' participation and ensuring that the research complied with ethical standards for working with minors. (see Appendix C). Additionally, children were informed about the study in age-appropriate language and gave their verbal assent to participate. The consent form specified that all data, images, and personal information would remain confidential and that only the initial of a given name or surname (without indicating which) would be used to facilitate data analysis.

The activities posed no physical or psychological risk, and care was taken to ensure the children's well-being during their sensory exploration. This included prior knowledge of relevant medical conditions, such as allergies to external elements or specific foods.

All digital and written data were stored securely and were accessible only to the researcher.

It is essential to highlight that this document did not employ conventional numerical identifiers (e.g., 1, 2, 3). Instead, it used letters derived from students' first or last names to facilitate clearer interpretation for the researcher. To ensure confidentiality and protect students' identities, the specific names from which these letters were taken were not disclosed.

The institution was informed about the purpose, methodology, instruments, and schedule of the study and granted authorization for the research to be conducted on the established dates.(see Appendix B)

Although parents play an important role in children's learning processes, their perceptions were not directly explored in this study, which represents a limitation and an opportunity for

further research.

3.3. Setting

The school was coeducational, where male and female students are taught together in the same environment. It is located in the northern area of Bogotá. It had a large green area, and classrooms usually had between 15 and 20 students each. The study was conducted with students from elementary level in a private school following Calendar A in 2025. The institution had 4 EFL teachers. They have English classes 7 days of the 8 calendar days scheduled. The curriculum subject was determined by the textbooks wonder family, in the case of the grade the book number four. They had four books. The student's and workbook and two additional reading books in the foreign language. The book had digital material such as audios and vocabulary cards. Each classroom was provided with a television in order to promote audio visual resources.

The institution's approach was Teaching for Understanding, which aimed to lead students toward comprehension rather than memorization, through problem-solving and by connecting topics to what is familiar and meaningful to them, allowing interaction with their classmates. For this reason, the classroom setting in this school differed slightly from traditional layouts, prioritizing circles and semicircles instead of the typical rows commonly used in most institutions. This arrangement sought to promote greater interaction among classmates.

3.4. Participants and sampling

The participants consisted of 20 students from Fourth Grade B, selected through a non-probabilistic sampling method. The sampling approach was intentional (or convenience) due to the researcher's accessibility to the population (Arias et al., 2016). The students shared similar

characteristics, with an average age of 9 to 10 years, and were located in the northern area of Bogotá. They belonged to socio-economic strata 3, 4, and 5. This approach is particularly valuable when the researcher seeks to investigate a specific population in depth (Arias et al., 2016).

To ensure a diversity of experiences within the sample, both genders were included, with 8 female and 12 male students, representing different levels of performance in the foreign language (high, medium, and low).

To reduce potential biases commonly associated with convenience sampling, several strategies were implemented. First, the institution had previously trained teachers on fundamental elements to determine students' learning styles using VARK-type assessments (Visual, Auditory, Read/Write, and Kinesthetic). Students' attitudes toward the subject and toward English vary considerably. Some students reported that they do not enjoy the subject because "it requires too much writing in the books." Others demonstrated stronger skills in reading, writing, and grammar, and therefore completed these types of activities very quickly. Some students disliked working with textbook-based tasks but performed very well in oral activities. Others showed a strong preference for art-related activities, such as crafts and work with textures, while some enjoyed movement-based tasks and games. In contrast, certain students performed well in textbook activities but participated less actively in dynamic or oral tasks. Additionally, two students received ongoing monitoring through internal guidance and external psychological support due to diagnoses related to hyperactivity and emotional self-regulation, following external referrals and assessments. These measures aimed to provide a rich and varied perspective on the phenomenon under study while acknowledging the inherent

limitations of non-probabilistic sampling.

3.5. Data collection instruments and procedures

For the purposes of this research, three artifacts were designed and implemented: the first to support the interoception session, the second for the tactile session, and the third for the taste-and-smell session. Additionally, three instruments were employed for data collection: video recordings and their corresponding transcriptions, the teacher's personal diary, and the Multisensory Activities Engagement Questionnaire for Students (MAEQ). These three instruments were analyzed and coded based on the theories of engagement and disengagement proposed by several authors, including Fredricks, J., Reschly, A., & Christenson, S. (2019), Connell (1990), Finn & Rock (1997), among others. Given the multidimensional and inherently complex nature of engagement and disengagement, it was necessary to generate both collective and individual codes for each student.

3.6 Artifacts

In qualitative research, artifacts are tangible objects that provide insight into the phenomenon being investigated. These can include instructional materials, tools, participant-created works (such as student assignments), or other physical items that embody experiences and meanings. Such artifacts serve as data sources because they capture concrete elements of the research context that extend beyond what participants can express verbally (Turner et al., 2002).
The current investigation involved the creation of artifacts for the sessions, which targeted tactile, olfactory, gustatory, and interoceptive experiences. This need arose because, in some

cases, the students' textbook materials did not allow for achieving the objectives of sensory exploration.

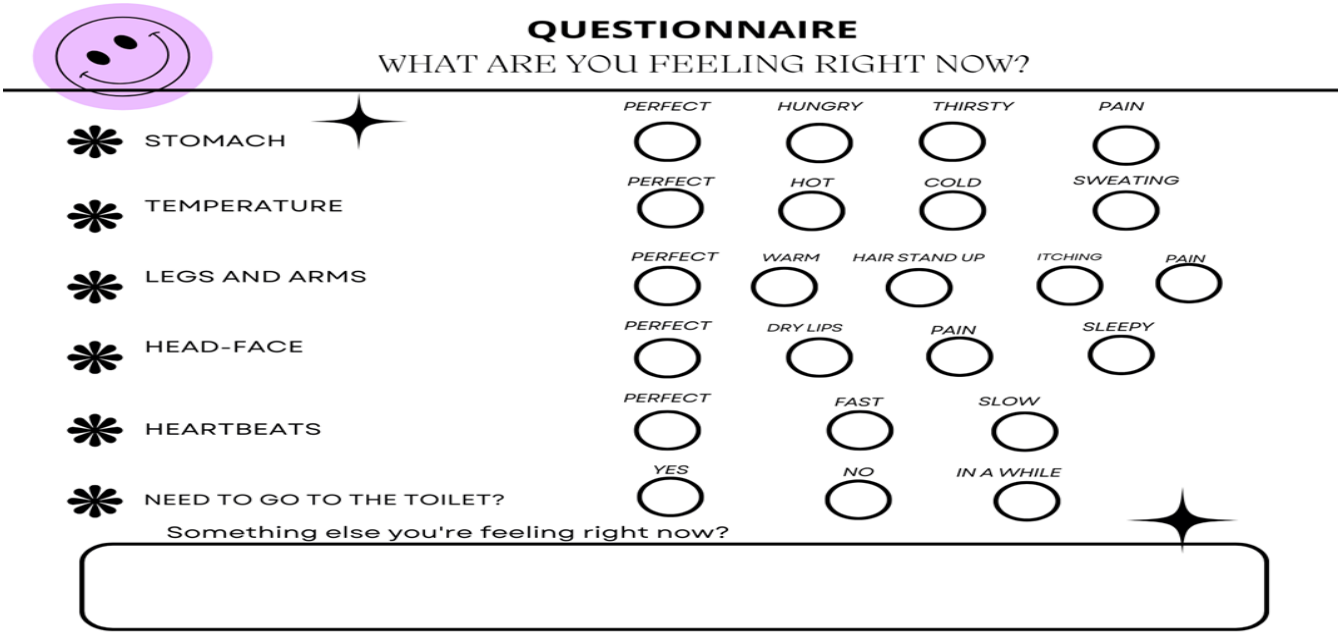
3.6.1. Interoception Survey

This artifact was created based on which led to the development of a small survey to support students in describing their internal sensations at the moment. As Barker M. et al. (2021) explained, this sense refers to "sensing internal signals from your body" (section, para. 1). A set of items and response options was designed based on the sample's basic needs and age. Although no authors directly connect activities or artifacts to education or EFL, Koch and Fuchs (2011) provided a foundation for implementing such practices with children, promoting tools such as mindfulness, conscious breathing, and awareness of internal needs. In order to count their own heartbeats, the activity was carried out with the support of the teacher, who guided the mathematical component so that students could become aware of changes in the number of heartbeats in resting and active heart rate.

It is relevant to clarify that this instrument is not intended to be objective, as its primary function is to help students connect with their internal sense of interoception, becoming aware of their heartbeat, breathing, and bodily changes, as well as any internal needs that arise during the activity. For a clearer understanding of its use during the session, a sample completed by a student has been included (see Appendix A).

Table 1

Interoception Survey



Note: Own elaboration.

3.6.2. Touch artifact

This artifact was developed after reviewing the group's textbook materials and finding no activities connected to the sense of touch. The student who wrote the answers had to be his/her partner since the student performing the activity had their eyes covered. It was divided into two components so that, in the first box, they could write the name of the object and explore and use vocabulary directly connected to this sense (soft, rough, prickly, rough, etc.). For a clearer understanding of its use during the session, a sample completed by a student has been included. (see Appendix A).

Table 2

Touch artifact.

Complete the item with your perception about each element:

NUMBER	I think it is…	I felt (Texture)
1.		
2.		
3.		
4.		
5.		

Note: *Own elaboration*

3.6.3. Smell-Taste Artifact

This instrument was developed with the objective of enabling students to express and record their olfactory and gustatory perceptions of various foods in the target Language. Three items were created (it smells like, it tastes like, I think it is..), in order to identify student's retronasal perception, according to Shepherd theory (2006). Because of the limited time, just four numbers were stipulated to write the name of foods offered. The activity was conducted in groups and with students' eyes blindfolded; therefore, a partner was responsible for documenting the responses. The instrument was organized into separate sections for smell and taste, and at the end, based on both perceptual inputs, students were asked to record which food they believed they had identified. It is important to clarify that this instrument is not intended to be objective, as its primary function is to help students connect with their perception of taste and smell, considering that each individual may have different interpretations and responses based on factors such as

concentration, sensory stimuli, and receptor sensitivity, as previously indicated in the theoretical framework (NCERT, 2007, p. 97). For a clearer understanding of its use during the session, a sample completed by a student has been included (see Appendix A).

Table 3

Taste and smell artifact.

NAME:			
NUMBER	 It smells like...	 It tastes ...	I think it is...
1.			
2.			
3.			
4.			

Note: Own elaboration.

3.7. Video recordings and transcriptions

The sessions were recorded to allow for a more in-depth analysis of students' engagement and disengagement. As Fredricks (2015) noted, "Student engagement is a complex term that requires its division in components" (p. 64). Engagement and disengagement are multifaceted constructs that must be examined from multiple perspectives, including behavioral, social, and emotional dimensions. Observing gestures and other forms of nonverbal communication was necessary to enrich the research process. Capturing these dimensions requires video recordings, which enable the teacher to observe engagement and disengagement as comprehensively as possible. The type of video recording used was observational recording. In this category, Penn (2015) affirmed that "the researcher follows subjects engaged in an activity. The camera is focused on a specific

action and records material that may be used as a database for coding and interpretation, for evaluation, or for profiling purposes" (p. 268).

During the pilot phase, platforms such as Teams and Zoom were initially used to facilitate transcription; however, it became evident that these tools were highly noticeable to the students, considering their age, which led to distractions and behavioral changes. Penn (2015) supported this concern, stating that this method can be very useful for studying learning or development over time, but care must be taken because students may feel observed or distracted by the equipment or researchers, which could affect their behavior or responses. (p. 268). Consequently, a mobile phone camera was used for recording, as it provided a more discreet means of documentation during the sessions. Parents and the institution were warned about the modification of the recording method.

Since this instrument can generate a large amount of content, the transcription process must be conducted carefully, with clear parameters regarding what will be analyzed in the audiovisual material that cannot be captured through written transcripts. Penn (2015) cautioned that "because of the many extraneous factors likely to affect recording and viewing, users should be aware of the often unconscious pressures exerted for a variety of interpretations of the intended message" (p. 267). Transcription had to be completed manually because the recordings were not produced using software with built-in transcription features, and their length (40–50 minutes each class) exceeded the capacity of available programs. Additionally, due to the background noise commonly present in a primary classroom, sometimes louder than usual, the transcription process was conducted personally to ensure accuracy. It is important to note that nonverbal information was also recorded within the transcriptions, using the labels "comments" and

"observations."

3.8. Personal Diary

This instrument formed part of a valuable process of self-discovery for the researcher. It is useful to draw on the work of DeVault (1997) who suggested that "personal revelation is only useful if links are made to analyze its relevance in terms of the broader study" (p. 215). These diaries were developed to complement and enrich the information obtained through the other instruments, reflecting the teacher's perspective and experience. Their aim is to move beyond the rigid structures promoted by traditional boundaries established in institutional documents. By leveraging personal perceptions and prior knowledge of the population and context, the diaries provide insights that may not be directly observable or recordable. Through professional experience with the group, the researcher was able to create a flexible space to document findings from each session. As Richardson (2000) affirmed, a teacher's work is grounded, contextual, and rhizomatic (p. 931).

Unlike the other instruments, these diaries also offer an opportunity to acknowledge the emotional and personal presence of the researcher, who played an active role in the investigation. The diaries were designed using a straightforward template to facilitate information gathering. This approach demonstrates both the practical and analytical relevance of reflexivity, as suggested by DeVault (1997), who argued that personal reflection is most meaningful when linked to analysis that addresses the broader study.

The diary begins with personal information at the top (diary number, grade, location of the session, and date). It is divided into two columns: on the left, there is a description of the activity, which details the step-by-step implementation of the session; on the right, space is provided for

the researcher to record notes, reflections, and interpretations for each session. This instrument was piloted in a master's class during the fourth semester, together with the research professor Patricia Moreno and classmates.

3.9. Multisensory Activities Engagement Questionnaire For Students

The Multisensory Activities Engagement Questionnaire (MAEQ) was designed based on the three dimensions of engagement proposed by Fredricks et al. (2004): behavioral, emotional, and cognitive engagement. The design also incorporated items from existing instruments, such as the Engagement Scale Questionnaire implemented by Mahmoud et al. (2022, p. 36), as shown in Tables 4 and 5.

Another instrument that informed the development of the MAEQ was the Student Engagement in Schools Questionnaire (SESQ), originally developed by Lam and Jimerson (2008, as cited in Shelley et al., 2011). Open-ended questions and narrative responses were included to capture students' personal interests, feelings, and perceptions regarding the activities conducted. The SESQ was initially developed to measure engagement across all subjects and the overall school climate in secondary education. Since the objective of the present study was focused exclusively on the English subject area, rather than on the institutional level or multiple subjects, several items from these existing questionnaires were modified. Adaptations were made to match the participants' age, the specific objectives of this research, and the nature of the multisensory sessions. The following section presents a sample of questionnaires from previous research related to engagement and disengagement.

Table 4

Factor Loadings for the SEISQ-ENG items

Factor	Item	λ	Communality
	I am very interested in learning. (a1)***	.44	.57
		(.38)	
1	I think what we are learning in school is interesting. (a3)	.85	.74
Affective:	I like what I am learning in school. (a5)	.79	.70
Liking for	I enjoy learning new things in class. (a7)	.52	.61
Learning	I think learning is boring. (a9R)***	.39	.41
		(.33)	
2	I like my school. (a11)	.92	.79
Affective:	I am proud to be at this school. (a13)	.87	.78
Liking for	Most mornings, I look forward to going to school. (a15)	.34	.36
School	I am happy to be at this school. (a17)	.77	.77
	I try hard to do well in school. (a2)	.45	.50
	In class, I work as hard as I can. (a4)	.45	.53
3	When I'm in class, I participate in class activities. (a6)	.32	.40
Behav.:	I pay attention in class. (a8)	.63	.55
Effort &	When I'm in class, I just act like I'm working. (a10R)	.66	.45
Persist.	In school, I do just enough to get by. (a12R)	.62	.41
	When I'm in class, my mind wanders. (a14R)	.42	.19
	If I have trouble understanding a problem, I go over it again until I understand it. (a16)	.50	.36
	When I run into a difficult homework problem, I keep working at it until I think I've solved it. (a18)	.52	.52

Note: Reprinted from The Student Engagement in Schools Questionnaire (SESQ) and the Teacher Engagement Report Form–New (TERF-N) by Hart, S. R., Stewart, K., & Jimerson, S. R. (2011), Contemporary School Psychology, 15, 67–79. https://doi.org/10.1007/BF03340964. Copyright 2011 by the University of California, Santa Barbara.

Table 5

Descriptive statistics on students' level of affective engagement.

	Affective Engagement	disagree		Neutral		Agree		Mean	St. D	Chi-Square	sig	Arrangement
		frequency	%	frequency	%	frequency	%					
12	I am very interested in learning English.	31	51.7	25	41.7	4	6.7	1.550	.62232	20.10	.00	5
13	I think learning English in school is interesting.	34	56.7	24	40.0	2	3.3	1.4667	.56648	26.80	.00	8
14	I like what I am learning in school.	29	48.3	25	41.7	6	10.0	1.6167	.66617	15.10	.00	3
15	I enjoy my English class.	24	40.0	27	45.0	9	15.0	1.7500	.70410	9.30	.01	1
16	I think learning English is boring. (R)	6	10.0	32	53.3	22	36.7	1.5667	.67313	17.20	.00	4
17	I like my English class.	25	41.7	31	51.7	4	6.7	1.6500	.60576	20.10	.00	2
18	I am proud to be in the English class.	33	55.0	25	41.7	2	3.3	1.4833	.56723	25.90	.00	7
19	Most mornings, I look forward to going to the English class.	35	58.3	21	35.0	4	6.7	1.4833	.62414	24.10	.00	6
20	I am happy to be in the English class.	36	60.0	22	36.7	2	3.3	1.4333	.56348	29.20	.00	9
	Total	**253**	**46.85**	**232**	**42.96**	**55**	**10.19**	**14.00**	**3.37488**	**37.53b**	**.00**	

Note. Reprinted from Student engagement in English Language classes: An evaluative study. Mahmoud, O, Mahmoud, A & Mohammed, D. (2022). Sohag University International Journal of Educational Research. Vol. (6) p 35-36.

To enhance comprehension, response options were simplified using emojis and three choices: yes, sometimes, and no. The questionnaire was administered in Spanish, the students' native language, to prevent misunderstandings.

For the pilot phase, the selected group was Fourth Grade A. Some colleagues from the master's program participated voluntarily in this process. The initial questionnaire included 25 statements and 9 open-ended questions. Both in the pilot conducted with the students and in the trial with classmates and the research professor Patricia Moreno, it became evident that this first version was too long, causing fatigue among the children and, in some cases, requiring the entire class period to complete. Based on the pilot results and suggestions from teachers and peers regarding the students' age, only four items were selected for each dimension (cognitive, emotional and behavioral). Open-ended questions were included at the end to allow students to express their personal perceptions in their own words. Subsequently, the items were organized according to the type of engagement. See the pilot questionnaire (Appendix F) and the official MAEQ questionnaire (Appendix E).

Table 6

Organization of items according to each dimension

DIMENSION OF ENGAGEMENT	TYPE AND NUMBER OF ITEM
COGNITIVE ENGAGEMENT Paying attention and spending mental effort in learning tasks by using cognitive strategy and knowledge to complete a task. Christenson et al. (2012: 161) Mahmoud O. Et al. (2022)	1.Usé el vocabulario en inglés sobre los sentidos en las sesiones. 2. Fue fácil prestar atención y esforzarme en las actividades multisensoriales. 3.Pude expresarme fácilmente con mis ideas y mi cuerpo. 4.Estoy aprendiendo cosas nuevas en las sesiones multisensoriales.

EMOTIONAL ENGAGEMENT Reflects positive and negative reactions or attitudes to teachers, classmates and the activities proposed that influence willingness to do the work.	5.Pienso que aprender inglés con actividades multisensoriales es interesante 6. Disfruté las sesiones multisensoriales con mi participación activa. 7.Me sentí feliz durante las sesiones multisensoriales. 8.Me conecté fácilmente con las actividades propuestas.
BEHAVIORAL Effort, persistence, attention, asking questions, and contributing to class discussion.	9. En las sesiones multisensoriales trabajé fuertemente. 10.Presté atención a las indicaciones dadas en las actividades. 11. Fui un(a) estudiante que participó mucho en las sesiones. 12.Realicé preguntas constantemente en las sesiones.

Own elaboration.

Chapter 4

4.1. Data Analysis and findings

The theoretical framework was used to conduct a deductive data analysis, in which Information is grouped into pre-established analytical categories based on the theoretical framework to facilitate the description and explanation of the phenomenon under study (Nguyen TNM et al., 2022). The dimensions of the engagement and disengagement theory served as the general premises for organizing the data collected.

These were employed as the broader, higher-order categories, while the specific categories selected corresponded to the dimensions proposed by the theory itself, in order to achieve greater analytical scope and research rigor, all the five identified dimensions were incorporated, they are behavioral, emotional, cognitive, agentic, and social.

The subsequent data analysis revealed activation across all five dimensions, with varying degrees of activation depending on the session. This process enabled the generation of codes

corresponding to each of the five dimensions. “category” was replaced with “dimension” in this study to facilitate analysis and to reach more precise and reliable conclusions, in accordance with the principles that categories should follow, as stated by Merriam (1998). These principles include that categories should “(1) reflect the purpose of the research, (2) be exhaustive, (3) be mutually exclusive, (4) be sensitive to category content, and (5) be conceptually congruent” (p. 97).

4.2. Procedure for data analysis

The data were collected by thirteen individual sessions between May, June, and July. Each one was designed to focus on intensifying one or two senses per session. This approach aimed to allow for a more precise description of the findings and students’ perceptions in each case. The senses of sight and hearing, smell and touch and proprioception and vestibular were combined, as theory suggested that some senses function jointly.

The planned activities were implemented based on suggestions in previous studies or adapted from practices in other areas, such as early childhood education, as well as activities created or modified according to students’ needs and the course materials. The final activity

(all senses session) could not be carried out due to schedule changes resulting from internal events held just before the start of the recess vacation.

Multisensory sessions Schedule

DATE	SENSES	ACTIVITIES	INSTRUMENTS
May 12th - May 16th	**INTEROCEPTION**	Feelings spa Mindfulness exercises (breathing, stomach, heart, extremities, senses)	*Personal diary N.1 *videorecording
May 12th - May 16th	**INTEROCEPTION**	Interoception Heart rate calm and excited questionnaire	*Interoception artifact *Engagement questionnaire *Personal diary N.2 *videorecording
May 19th- 23rd	**SIGHT/HEARING**	Activities from the book accompanied by sounds, videos and pictures.	*Personal diary N 3-4 *English Books *videorecording
May 19- 23rd	**SIGHT/HEARING**	Activities from the book accompanied by sounds, videos and pictures.	*English books *Personal diary N 3-4 *Engagement questionnaire *videorecording
May 26th- May 30th	**PROPRIOCEPTION**	Body and limbs exercises to promote body awareness in space and strength needed to complete actions.	*Personal diary N.5 *videorecording
May 26th- May 30th	**PROPRIOCEPTION**	Body and limbs exercises to promote body awareness in space and strength needed to complete actions.	*Personal diary N.5 *videorecording
May 26- 30TH	**VESTIBULAR**	Body activities to promote the sense of balance and special orientation.	*Personal diary N.6 *videorecording
May 26TH- June 3rd	**VESTIBULAR**	Body activities that promote the sense of balance and special orientation.	*Engagement questionnaire *Personal diary N.6 *videorecording
June 4th- June 13th	**Taste and smell (IDENTIFY THE FOOD)**	Activities that promote an experience with taste and smell vocabulary according to their perception.	*Personal diary N.7 *videorecording
June 16th 20th	**Taste and smell Recipe**	Recipe creation	*Engagement questionnaire *Personal diary N.7 *videorecording
June 23rd- 27th	**TOUCH (IDENTIFY THE SHAPE)**	To provide and identify different textures blindfolded.	*Engagement questionnaire *Personal diary N.8 *videorecording

July 1st- 4th	**TOUCH (Textures)**	To provide and identify different textures blindfolded.	*Engagement questionnaire *Personal diary N.8 *videorecording
July 7th- 11th	**ALL SENSES**	create your own alien and planet	*Engagement questionnaire *Personal diary N.9 *videorecording
July 7th- 11th	**ALL SENSES**	Create your own Edible slime	Engagement questionnaire *Personal diary N.10 *videorecording

Note: Own elaboration.

4.3. Coding

The coding process was conducted based on the engagement and disengagement theoretical framework proposed by Fredricks, Reschly, and Christenson (2019), as well as on earlier conceptualizations of engagement (Karweit, 1989; Peterson et al., 1984; Epstein and McPartland, 1976; Yamamoto et al., 1969; Eccles et al., 1983; Boekaerts et al., 2000; Zimmerman, 1990, as cited in Fredricks et al., 2004, p. 59). Although these frameworks do not explicitly distinguish between individual and collective engagement, the cross-instrument analysis revealed the need to generate separate codes for these two levels. This decision allowed for a more comprehensive examination of how the different dimensions of engagement were activated and for a deeper understanding of the foreign-language output produced both individually and collectively.

Data analysis followed a deductive approach grounded in the theoretical framework. The categories employed correspond to the engagement dimensions presented in the first section in Figure 7 (behavioral, cognitive, agentic, emotional, and social). The "Characteristics" section includes the indicators proposed by the theory to identify each type of engagement or disengagement across the instruments. Based on these indicators, the coding scheme presented in the table was developed. Given that, as the theory itself suggests, certain behaviors or patterns

may be associated with two or more engagement dimensions (Fredricks et al., 2019, p. 2), it was necessary to incorporate an additional category labeled Interrelationships.

Based on the characteristics identified within each dimension and the interrelationships established among them, separate codebooks for engagement and disengagement were developed to ensure a systematic understanding of the origin and operational definition of each code, as well as to provide representative examples derived from the data analysis, thereby strengthening the interpretation of the study's findings.

It is important to note that, given the complexity of distinguishing between engagement and disengagement, both verbal and non-verbal student behaviors were incorporated into the coding process.

Engagement Codebook Table

DIMENSION	CODE	DEFINITION	EXAMPLE FROM TEXT OR VIDEO RECORDING
BEHAVIORAL	BEFOLLOW	Verbal and non-verbal cues in the student's behavior that demonstrate attentive listening, asking questions, contributing to class discussion or following instructions.	T: mmm..smell something sweet. N. O: ¿Ms. que significa sweet?
	BEFOLLOWL1	Students' individual oral participation in their native language.	T: What is the difference between a comet and a meteorite J.D: Ms. los cometas son de hielo y los meteoritos son de piedra.
	BEFOLLOWL2	Students' individual oral participation in the foreign language (output).	T: How many satellites do we have around planet Earth? C.N: I don't know
	BEFENGROUPL2	Students' collective use or response in English.	T: This is the first planet from the sun. Comments: Mercury
BEHAVIORAL AND EMOTIONAL	BEHAVEMO	Student's collective eagerness to participate again. It can be interpreted as enthusiasm and enjoyment of the task.	Did you feel the power of the sound? Comments: Yes! Repítelo (Whispers)
	BEHAVEMOIND	The student's individual eagerness to participate again, showing enthusiasm.	D.S: ¿Ms. puedo ser el árbitro otra vez?

			N.M: ¿Ms. después puedo yo?
COGNITIVE	COGIND	The student's Interest in learning- deep understanding, making connections and applying them to new situations	T: There are different levels, so they throw all the energy into each compartment and at the end they just have this small vehicle. A.A: Ms. y que pasa con eso, Ms. pero eso sería basura espacial.
	BEHAVCOGIND	The student's effort and Persistence. Self-regulation, suppressing distractions	Observation: Antonia had some difficulties with the activity, but teacher encouraged her and she could finish it.
AGENTIC	**AGENTPRO**	This dimension is activated when the student tries to personalize or improve the activity, making suggestions or expressing their preferences	D.S: ¿Ms. puedo ser el narrador? No hay un narrador aquí.
	COGAGENT	The student seeks help when necessary, showing interest in carrying out the activity.	T: Draw your alien. So, let's start. Imagine that this is my alien. It has two hands and two eyes. S.P: (she approaches to the teacher) No entendí nada.
EMOTIONAL	**EMOIDENT**	Collective identification with the activities. Positive reaction of the proposed activities.	T: One, two, three, four people. Everybody is going to touch the rope. Observation: They were paying attention excitedly.
	EMOIDENTIND	Individual identification with the activities. Positive reaction of the proposed activities.	T: Next activity: Let's make groups of two people with a rope L.P: ¿Fuerza? ¡Es de fuerza! **EMOIDENTIND**
	EMOIDENT-BOYS	Identification or positive reaction to the proposed activities mostly in boys.	Observation: Most of boys were running, doing pushups in order to have faster heart beats.
	EMOIDENT-GIRLS	Identification or positive reaction to the proposed activities mostly in girls.	Observation: Girls were jumping the rope laughing.
SOCIAL	**SOCENG**	It refers to group activities, interpersonal connections such as students' interactions with their teachers and peers, general comments.	A.A: Profe ¿Podemos dormirnos? Esto es muy relajante, Despiértenme cuando se acabe la clase. Comments: por 2…por 10.

Note: Own Elaboration.

Disengagement Codebook Table

DIMENSION	CODE	DEFINITION	EXAMPLE
BEHAVIORAL	**DISENGEXT:**	When collective disconnection occurs due to external factors, generating interruptions, doing something else or postponing the proposed activity.	T: We are going to jump or try to run for two minutes. Comments: No, no. Ms. estamos cansados de correr en educación física. T: Come on! Just two minutes. Ready? Jump, jump, everybody.
	DISENGBEHAVIND:	When individual disconnection occurs due to external factors, generating interruptions, doing something else or postponing the proposed activity.	A.E: Entre A.B y C.N ¿Quién ganará, esto será épico? Observation: all of them were paying attention except A.A and J.D.
	DISENBOYS:	No Identification or negative reaction to the proposed activities, mostly in boys.	Observation: At the beginning most of the boys were playing a different game (except for J.D).
	DISENGIRLS:	No Identification or negative reaction to the proposed activities, mostly in girls.	T: Next exercise. You jump the rope and run. Observation: girls were talking distracted.
Cognitive	COGEMODISENG	Cognitive and emotionally disengaged. Doing the bare minimum. Work superficially.	Observation: D.S worked superficially, doing the bare minimum. He mentioned he didn't understand instructions in English.
	EMOCDISENG	-Cues of Sadness, boredom, anxiety, and frustration. -Failed to develop a connection with adults or peers.	T: Now boys ..it's your turn. (Boys jump and they shout). Observation: S.A and D.S lost, they looked angry.
	SOCDISENG	Disengagement because of social factors.	Observation: At the moment they were instructed to put on the hoodies for the activity, most of them refused and briefly showed a negative attitude.

Note: Own Elaboration.

4.4. Recordings - Transcriptions Findings

Considering the thirteen recorded sessions, transcriptions were made. Based on these two tools, an analysis was conducted using the theoretical framework of engagement and disengagement. This aimed to address not only the oral aspect, but also the reflection of students' emotions and their individual and social behaviors, which are a fundamental part of the theory, divided, as previously mentioned, into five types: behavioral, emotional, cognitive, agentic and

social. Certain labels were included to provide greater clarity for the reader; the label "Comments" refers to collective responses recorded during classroom interactions. The label "Observations" refers to researcher-recorded notes describing collective behaviors or interactions that complemented the verbal data. These were coded accordingly and used as part of the data analysis. A sample of the transcriptions has been included (see Appendix D).

This section is organized by groups of sensory-based sessions (interoception, sight-hearing, proprioception, vestibular, taste-smell, touch and "all the senses" session. Each group presents its results in two parts. The first presents a general analysis of the activation of the engagement and disengagement dimensions in each group of sessions, according to the senses involved. The second part focuses on individually identified elements that were of particular relevance, as they enriched the collective findings and, therefore, excluding them would have biased the results. These elements include aspects related to students' behavior and emotions, as well as their use of L1 and EFL during interactions. They also encompass different types of participation, such as answering questions or expressing doubts (behavioral), making connections with prior knowledge or applying it to new situations (cognitive), and suggesting changes, personalizing activities, or expressing preferences (agentic). Excerpts from the transcriptions were presented in Spanish in order to preserve the students' voices and their spontaneous interactions. The activities mentioned are described in detail in the Personal Diary section. Hyperlinks were created to facilitate easy access to them.

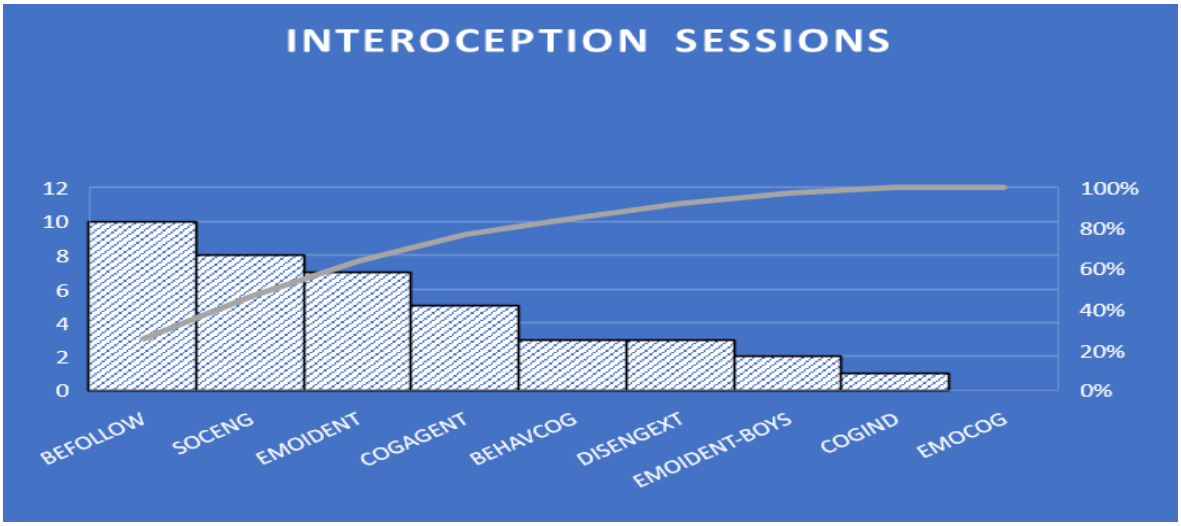
4.4.1. Interoception sessions

This section presents the findings derived from the analysis of the transcriptions and video recordings of the two interoception sessions. During these sessions, students used an

artifact that enabled the measurement and identification of internal bodily sensations, such as pulse and heart rate, breathing, and other interoceptive signals. Detailed information about the activity guide used during this section can be accessed through the hyperlink (See activities guide).

Figure 9

Collective activation rate of types of engagement and disengagement.



Note: Own elaboration.

At the beginning of the activities proposed students felt tired because they were in physical education class, showing disengagement in the active activity. Although, at first, some were reluctant to participate in the activity, the teacher continued providing instructions for the activity in accordance with the artifact's guidelines (namely, calculating heart rate during the second session and promoting relaxation to enhance awareness of internal bodily sensations in the subsequent session). Observations revealed that several classmates moved freely around the classroom to carry out the activities such as increasing their heart rate or laying their feet on the

table, which increased the social engagement dimension and led to the activation of the code SOCENG, as reflected in their group comments in the corresponding excerpt of the transcription "**¿**Profe Podemos dormirnos? How do you say dormir? Esto es muy relajante, Despiértenme cuando se acabe la clase… por 2., por 10" (group comments, Session 1, interoception).

They demonstrated a high level of participation, ability to follow instructions, concentration, and attentive listening, which reflects a strong degree of behavioral engagement with the code BEFOLLOW. Likewise, they activated the code BEFOLLOWL2, since the use of English was observed as they communicated and expressed how they felt their bodies internally, using the expressions suggested in the instrument, as could be seen in the following transcript segment:

> **Comments (Group response):** legs and arms? Perfect BEFENGROUP
>
> **Teacher:** How do you feel? When we are scared our hair stands up. Or our tiny hairs stand up.
>
> **Student D.S:** Me siento perfect…I feel perfect (everybody laughs) EMOIDENT BEFOLLOW
>
> **Teacher J.D:** yo tengo perfect, hungry thirsty, cold BEFOLLOWL2
>
> **Teacher:** Itching. Do you feel your arms itching? For example, N.O feels pain in his leg.
>
> **Comments (Group response):** No. Ms. Yo estoy perfect. BEFOLLOW
>
> **Student J.D:** Ms. I feel pain BEFOLLOWL2

(Classroom interaction, Session 1, interoception).

They were asking for the meaning of different vocabulary in English. Students showed interest in understanding the meaning of the vocabulary used, reflecting curiosity and willingness to learn. It was evident that students felt comfortable and happy during the activity, which contributed to greater emotional engagement and self-regulation, which is tagged with the code EMOIDENT and BEHAVCOG. In addition, there was an increase in participation among male students, especially when asking questions or seeking help; an aspect that improved compared to regular lessons, triggering the code EMOIDENT-BOYS and COGAGENT, as evidenced in the excerpt from the transcription:

> **Observation:** The students C.N, A.E, N, O, J. V, D.S, E.C continue moving their body, supporting each other in the exercise **SOCENG-** EMOIDENT BOYS
>
> **Teacher:** Ready? Jump, jump, everybody!
>
> **Observation:** (Most of the boys were running, doing pushups in order to have faster heart beats, especially E.C, N.O, L.P, S.P EMOIDENT BOYS.
>
> **Teacher:** So, we multiply. For example, in this case N. O 6 times 23 equals 136.
>
> **Student J.D:** Ms. ¿pero por qué ahora late más rápido? COGIND
>
> **Student A.A:** El mío 82 por minuto.
>
> **Comments (Group response):** Ms. Please help me! **COGAGENT**

(Classroom interaction, Session 1 and 2, interoception)

Finally, three moments of collective self-regulation were identified, during which students suppressed distractions to focus on counting their heartbeats, as shown in the excerpt of the transcription:

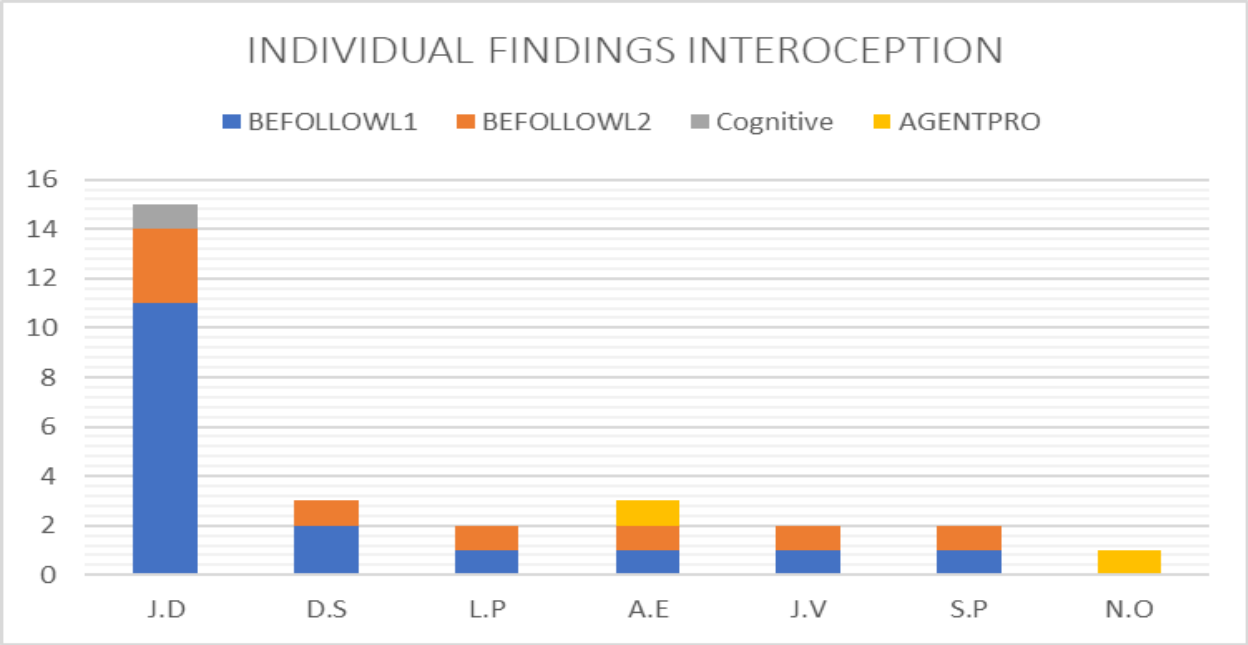
> **Teacher:** When I say 3, I start counting. 1, 2… ready? You need to count!
>
> **Observation:** They start to count as mentioned in the instructions BEFOLLOW **BEHAVCOG**
>
> **Comments (Group response):** yo sí siento, yo no
>
> **Teacher:** Stop. How many?
>
> **Student A.E:** yo si siento
>
> **Student J.V:** si siento
>
> **Comments (Group response):** 20, 27, 27, 17, 50,20,25.

(Classroom interaction, Session 2 interoception)

Individual findings Interoception

Figure 10

Individual activation rate of types of engagement and disengagement



Note: Own elaboration.

The previous figure shows in blue the students' individual participation in their native language, and in orange their participation in English. These are framed within primary behavioral elements, such as giving a correct answer or asking a question to clarify a doubt. Group participation is not shown here, as it is part of the general analysis under the code BEFOLLOW.

The gray section represents cognitive participation, where students generated questions that aim to connect or apply knowledge to other situations.

Finally, the yellow section refers to agentic participation, where students suggested changes and/or expressed their point of view regarding the proposed activity, as made evident by the transcription sample in the intervention of the student N.O: "¿Podemos fusionar esto con poner los pies sobre la mesa?" (Interoception Session #1).

It was evident that seven students were much more participative orally, while all participated at a kinesthetic level, both in their mother tongue with the BEFOLLOW1 code and in English with the BEFOLLOW2 code, although less frequently. However, it is important to highlight that students who usually do not participate in class (D.S, J.V, A.E, S.P, N.O), neither in their mother tongue nor in English, were the ones who, in these particular sessions, made a greater effort and even used some expressions in the target language, as the transcription sample demonstrated with the intervention of the student D.S "Me siento perfect…I feel perfect" (Interoception Session #2). N.O and A.E activated the AGENTPRO code, making suggestions, expressing their preferences, and letting the teacher know what they wanted. The following is an extract of their interventions "Ms.¿puedes poner una canción para relajarnos? (Student A.E, Interoception Session #1).

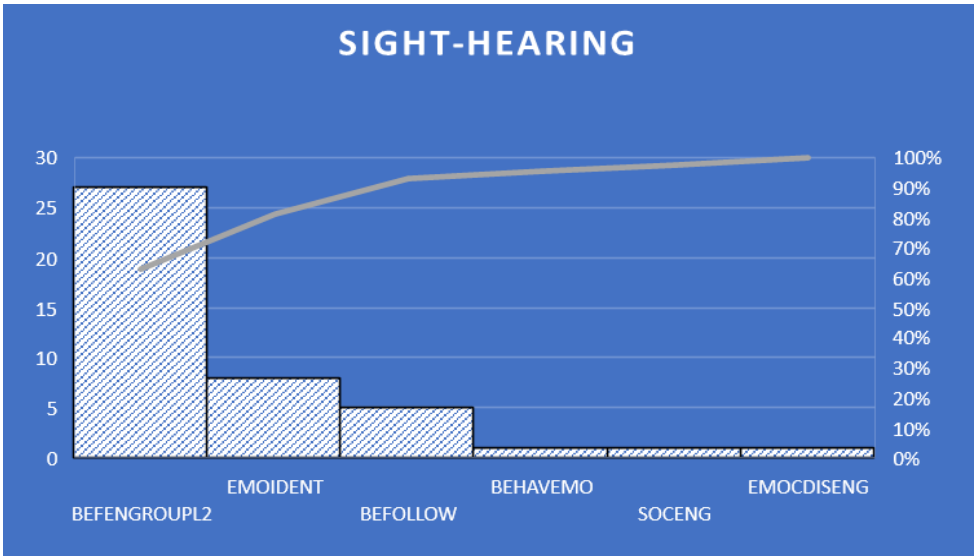
Although few studies have directly examined the role of interoception in foreign language teaching and learning, authors such as Wu, Wahle, and Mohammad (2025) argue that embodiment is intrinsic to language and can be pedagogically leveraged in EFL instruction. Their findings demonstrate a statistically significant association between body-part-related terms and emotional expressions, suggesting that language learning can enhance students' awareness of bodily and emotional meaning (p. 8).

4.4.2. Sight-Hearing sessions

This section reports the descriptive findings derived from the sight-hearing sessions. Detailed information about the activity guide used during this section can be accessed through the hyperlink (see activities guide).

Figure 11

Collective activation rate of types of engagement and disengagement.



*Note: Own elaboration***.**

At the beginning, they showed resistance toward the first proposed activity, because it involved writing and using the book. Although most of the students were very interested in the audio/visual input. There were some students who were not interested in the audio/visual input, some of them were requesting permission to leave: (J.R, E.C, D.S, M.S), as observed in the transcribed portion:

Student D.S: Ms. puedo ir a cosas perdidas **DISENGBEHAVIND**

Observation: M.S. approaches the teacher.

Student M.S: May I go to the nursery? Quiero preguntar algo. **DISENGBEHAVIND**

(Classroom interaction, Session 2 Sight-Hearing)

They asked several questions and they knew some facts about the scientific topic of the solar system. That is why the code BEFOLLOW was activated. Because of the complexity of the topic, some of the students did it in Spanish. It was shown that they understood the ideas in English (input) and this connection with the input encouraged them to ask questions and participate using the foreign language. Thus, the code BEFENGROUPL2 (collective participation in English) was highly activated. Then, an excerpt from the transcription was selected:

> **Teacher:** It looks like the sun because it is very powerful. Is it shiny or dull?
>
> **Comments (Group response):** shinny BEFENGROUPL2
>
> **Teacher:** It is a strong machine, very powerful. Yes? Does this machine go far or close?
>
> **Comments (Group response):** Far BEFENGROUPL2
>
> **Comments (Group response):** La verdad me dieron ganas de hacer una maqueta de esto o del sistema solar. Si!! EMOIDENT
>
> **Teacher:** This machine is very noisy and bright. I think this machine is the most powerful machine in the world, yes?
>
> **Teacher:** Do you prefer a launch during the day or during the night?
>
> **Comments (Group response):** Some of them answered “day” others “night”. (shouts) BEFENGROUPL2

(Classroom interaction, Session 2 Sight-Hearing)

The rise of the code EMOIDENT reflected that they felt more motivated by real input from the world such as videos of real spaceships launches and real sounds from frequent animated drawings and videos suggested by the textbook and videos for kids. This reaffirms what Piaget mentioned about the importance of using both, abstract and concrete knowledge in this stage, since they are also becoming "more cognizant of their surroundings and their own emotions, as well as more abstract in their intellectual processes" (cited by Mah and Ford-Jones, 2012, p. 81). It was evident that some people reported feeling chills or fear with the audio/visual input due to the force generated by the explosion, the brightness, and the visual impact of a rocket launch; likewise, their behavioral and emotional engagement increased, manifesting joy, surprise or amazement with what was observed, as can be reflected in the transcription segment:

> **Teacher:** (Play de video) They use water to cool off the engine. Did you see the water?
>
> **Student J.D:** ¿Cómo no se recalientan con tanto fuego? COGIND
>
> **Comments (Group response):** Uy es azul, morado, blanco, (es de todos los colores)
>
> **Observation:** The video is very noisy because of the launch.
>
> **Comments (Group response):** Bye….chaooo (Sing together: ¡que calor, Por qué está haciendo tanto calor! (internal comments) **EMOIDENT**
>
> **Student J.D:** Ms. I have a question
>
> **Student L. M:** (surprised) Ms. parece el sol, parece el amanecer COGIND

(Classroom interaction, Session 1, Sight-Hearing)

Finally, it is evident that the social part was relevant to generate engagement, as in the case of the final listening, where they began to challenge each other about what the next word of the audio would be. Social disengagement was also present in one student, when, for example, the teacher did not give the student A.E the opportunity to participate and he got upset (due to the classroom noise and the handling of the audiovisual materials, the teacher did not notice this detail during the lesson itself, but rather through subsequent observation of the audiovisual recordings). This was reflected in the portion of the transcription:

Listening input: 4 satellite

Comments (Group response): vamos! **SOCENG**

Listening input: 5 Earth, 6 rings

Observation: Some of them were excited **SOCENG**

Comments:(Group whispers in which they bet on which image would follow in the audio)

Listening input:7 alien

Comments (Group response): (Grupal Shouts) **SOCENG**

Teacher: So, what is the function of a satellite?

Student A.A: To communicate BEFOLLOW

Teacher: Yes, so thanks to them we have…

Comments (Group response): internet, wifi.. BEFOLLOW

Student J.V: Formas de comunicarse BEFOLLOW

Student A.A: Ms. ¡déjame hablar! **EMOCDISENG**

(Classroom interaction, Session 2, Sight-Hearing)

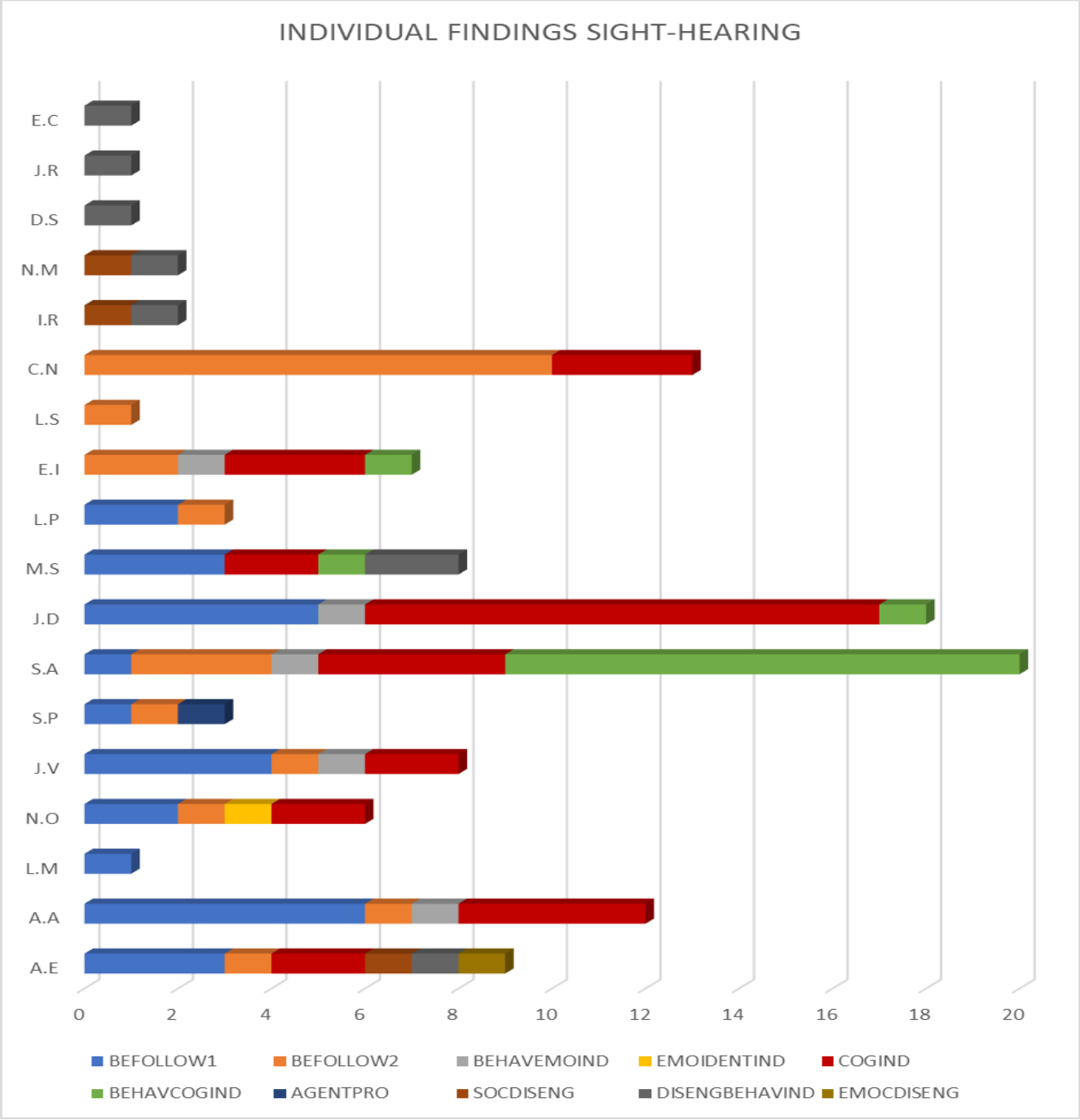
Individual Findings Sight-Hearing

There was evidence of an increase in behavioral type engagement in students who usually do not participate in class (L.P, S.P, L.M and M.S) as it is shown in the transcription excerpt "The astronaut is weaker than the alien" (Student L.M, Sight-hearing session #1). This demonstrated their interest and connection with the concrete and authentic audiovisual elements used in the sessions. The cognitive dimension increased when they give their point of view, make connections with their previous knowledge, metalinguistic reflection, problem solving or application of knowledge to new situations in students such as J.D, E.I, A.A, C.N, M.S. This is revealed in the intervention of the student J. D "Los astrólogos descubrieron que caen mas de 10 mil ninimeteoritos en todo el año" (Sight-hearing excerpt, session #1)

An increase in cognitive engagement was observed among students who usually participate minimally in oral and written activities (S.A., J.V., N.O., A.E.). The audiovisual input may have created a more favorable environment for these learners to ask exploratory questions and establish connections with their context, as indicated by the excerpt segment "Ms Nathalia is more smaller [sic] than you" (student S.A, Sight-hearing excerpt, session #2).

Figure 12

Individual activation rate of types of engagement and disengagement



Note: Individual activation rate of types of engagement and disengagement. Own elaboration

Five students (J.R, D.S, N.M, I.R, E.C) showed very little attention, activating the SOCDISENG and DISENGBEHAVIND codes with the use of audiovisual input. Probably these students benefit from alternative sensory channels. However, this pattern may also be partially explained by external distractions, which prompted some students to redirect their attention to unrelated activities using their school supplies. Nevertheless, this time, more students (ten of them) participated asking questions or opinions, using their mother tongue or English, especially S.A, E.I, C.N, as can be seen in the transcript segment "Mr. Osmar is taller than Ms. Carolina" (student E.N. Sight-hearing excerpt, session #2).

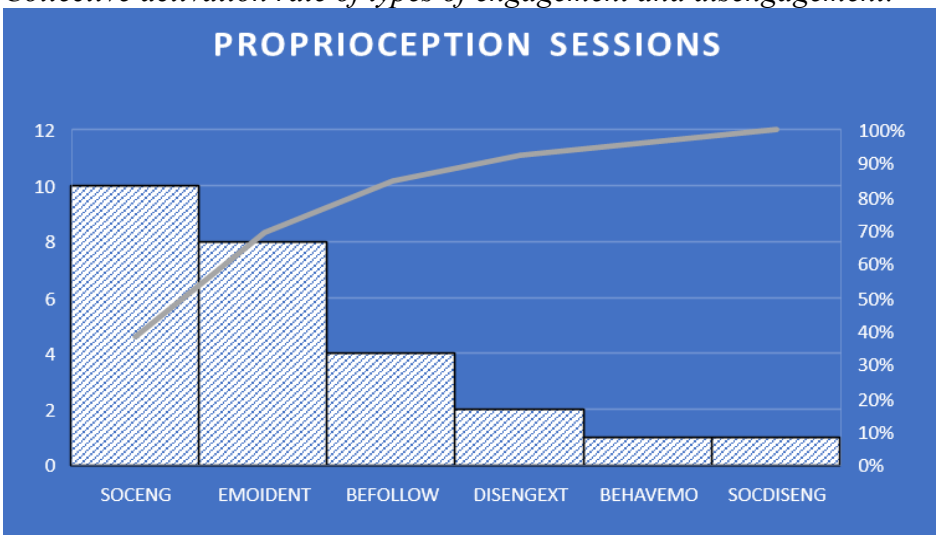
Students with spatial skills participated more in class than they usually do without these real, visual, and auditive elements. It was clear that students that usually do not participate, this time showed curiosity with their opinions and questions (M.S, S.P, J.V, N.O, L.M, A.A, A.E). As Morgan (2021) mentioned "Multiple intelligences proposed that children with weak verbal skills, but strong spatial skills will much more likely improve their verbal skills if their teachers use plenty of pictures, images, photos, and drawing activities" (P. 133).

4.4.3. Proprioception Sessions

This section reports the descriptive findings derived from the proprioception sessions. Detailed information about the activity guide used during this section can be accessed through the hyperlink (see activities guide).

Figure 13

Collective activation rate of types of engagement and disengagement.



*Note: Own elaboration***.**

A strong sense of identification with the proposed activities was observed, especially with the second one (soccer crab), activating the EMOIDENT code. It was easy to give and follow the instructions in English to carry out the activities; this suggested the code BEFOLLOW, since they were accompanied by an example of the activity or an exercise to follow. This was evidenced in the following transcription excerpt:

> **Teacher:** We are going to play crab soccer, we have a goal and a ball like soccer, but the idea is to stay walking with our hands and feet with the trunk up and kick the ball with our feet) Are you ready? Let's get started!
>
> **Observation:** The match starts with the indicated mixed groups BEFOLLOW
>
> **Comments (Group response):** Gooll! EMOIDENT

Observation: Students that weren't playing but were participating actively: L.P, J.V, S.A, A.E **EMOIDENTIND**

(Classroom interaction, Session 2, proprioception)

There was greater social interaction in these activities, which activated the SOCENG code, including frequent comments about the activities proposed, the student's expertise in each activity or even supporting those classmates who found the activity challenging, such as in the case of N.O. S.A and J.P, who had difficulties with the exercise, but their classmates encouraged them to continue, consequently, the code BEHAVEMO was activated , as observed in the transcription excerpt:

Teacher: Guys, in order ok?

Observation: Every couple did the exercise. Some of them were laughing and sharing their comments about the game and the couples **SOCENG.**

N.O had some difficulties with the activity, some of them decided to encourage him. **SOCENG BEHAVCOG EMOCOG.** They start to shout their names …. Faster- slower, A.E, J.D, A.A, E.I, N.O). **EMOIDENT**

Teacher: Very good. An applause! Next couple Lucas and Santiago.

Comments (Group response): Hágale!.. you can do it!

Observation: S.A had difficulties with the exercise, but the classmates motivated him to continue and he finished it) **BEHAVCOG EMOCOG**

(Classroom interaction, Session 1, proprioception)

Some moments of disengagement were observed, which pulled out the DISENGEXT code. It appeared to be due to external factors (Background noise generated by passing aircraft, physical education classes from neighboring classrooms, and staff engaged in food distribution, among other factors) and the activity itself that was playing with the rope and following physical activities, as the transcribed excerpt suggested:

> **Observation:** Students that were looking at their peers but doing other activities such as coloring, talking or playing other games: M.S, B, J. R, I. R, S. P, L.M, J. D, AA.
>
> **DISENGEXTIND**

(Classroom interaction, Session 2, proprioception)

In these sessions, students' verbal participation in both the foreign language and their mother tongue was limited due to the nature of the activities. Nevertheless, a wide range of English input was provided through the external setting and the planned physical tasks, with the purpose of offering communicative and comprehensible input. As Krashen stated (1982), "The best methods are therefore those that supply comprehensible input in low anxiety situations, containing messages that students really want to hear" (p. 6).

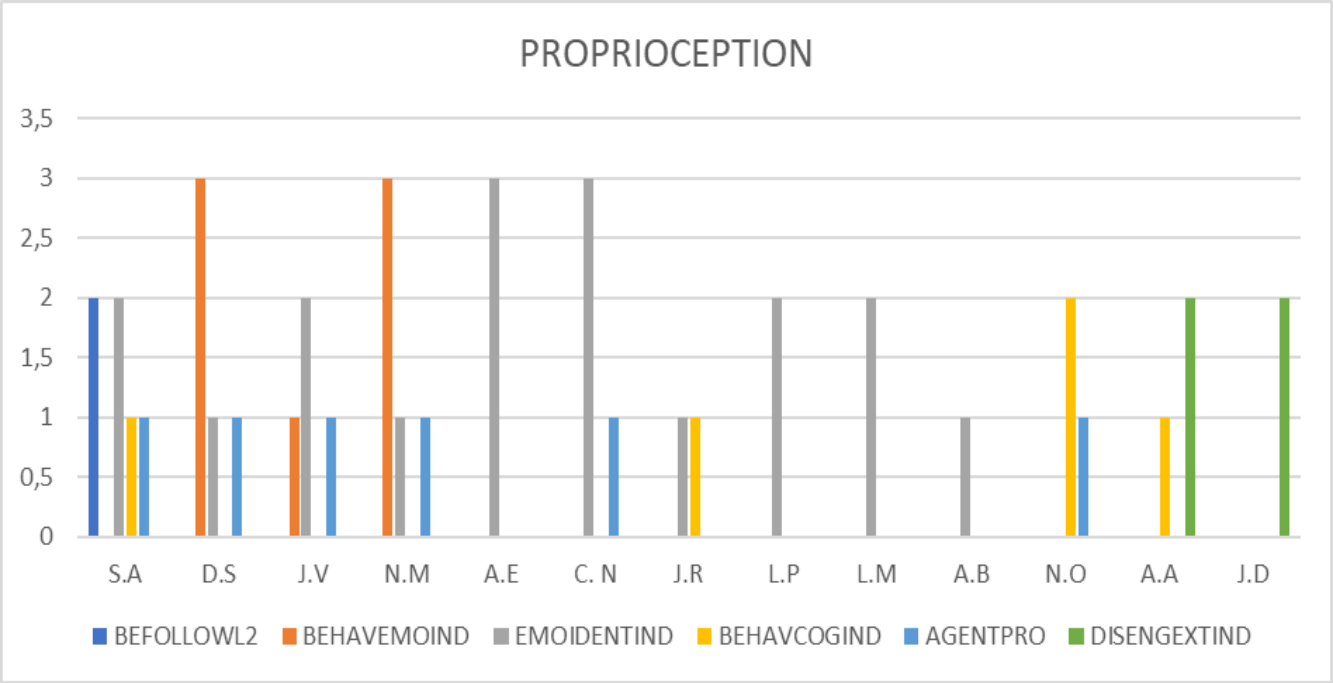
In conclusion, the interoception sessions contributed to an increase in both behavioral and emotional engagement by connecting a greater number of students with the classroom activities.

These sessions fostered not only behavioral engagement, often restricted to rule-following or compliance with instructions but also more active forms of participation, in which students assumed an agentive role in the activities and even expressed a desire to repeat the experience.

Individual Findings proprioception

Figure 14

Individual activation rate of types of engagement and disengagement



Note: Own elaboration

Students who usually do not stand out or participate in regular activities showed increased participation during the proprioception activities, triggering the code BEHAVCOGIND, especially A.A, N.O, J.R, N.M, they activated the code AGENTPRO because of their desire to participate again and showed greater creativity or contributions to the proposed activity, as made evident by the transcription sample “Ms tengo una idea, la roja es cuando entran y la otra cuando salen” (student N. M, Proprioception excerpt, session #2).

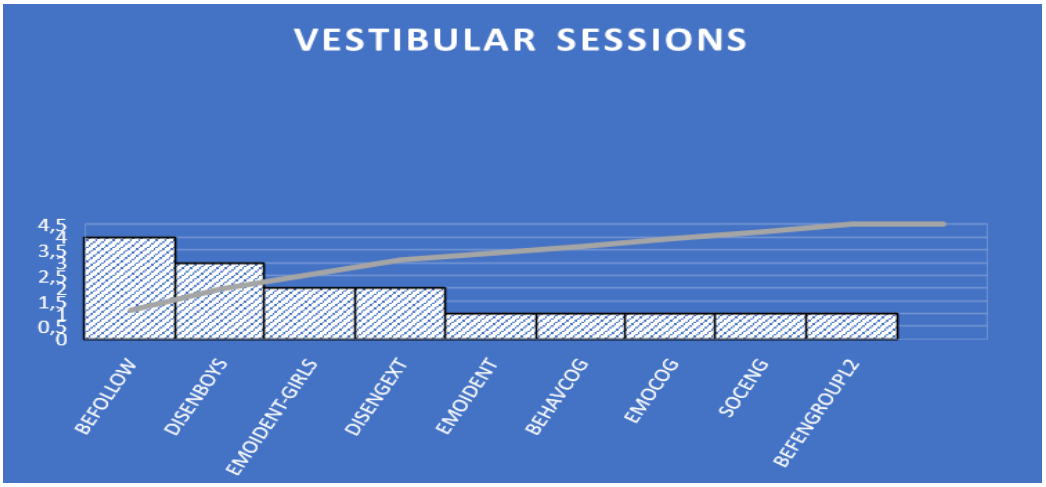
The student A.A. had some moments of disconnection but at the same time of active participation with the proposed activities. However, their effort and persistence were notable, largely due to social motivation. Here it is important to highlight the sociocultural theory built for Vygotsky (1978), which claimed that higher mental functions (including language) develop first on the social plane (through interaction) and then on the psychological plane (internalization). Language is a mediational tool that enables cognition and communication, and interaction (with teachers or peers) provides the scaffolding that allowed learners to achieve what they cannot do alone.

4.4.4. Vestibular Sessions

This section reports the descriptive findings derived from the vestibular sessions. Detailed information about the activity guide used during this section can be accessed through the hyperlink (see activities guide).

Figure 15

Collective activation rate of types of engagement and disengagement.



Note: Own elaboration.

The vestibular activities showed several moments of engagement and disengagement. Students attempted all the exercises actively, following the rules and maintaining focus, thereby activating the behavioral-following BEFOLLOW code. In the first part, they had to throw a ball while saying a phrase to call a partner's name in the foreign language, and all of them participated using the target language, showing group behavioral-linguistic engagement with the BEFENGROUPL2 code. This was revealed in the transcribed data:

> **Teacher:** Throw the ball. Say the name of the person that you are going to throw the ball, I'm going to start, so, I throw the ball to L.M. You catch the ball standing with one leg.
>
> **Observation:** They were doing the exercise while they say in English "I throw the ball to. "BEFENGROUPL2
>
> **Teacher:** Now, we are trying to move this building
>
> **Observation:** everyone was pushing the wall very hard. BEFOLLOW EMOIDENT
>
> **Comments (Group response):** Ms. pero como se va a mover la pared
>
> **Teacher:** Believe in miracles. Let's do it again. Is it Impossible?

(Classroom interaction, Session 1, vestibular)

At certain points, particularly the boys became distracted, indicating moments of gender-specific disengagement with the code DISENBOYS, while the girls showed an increase in engagement, indicating emotionally-driven identification and motivation with the code EMOIDENTGIRLS. This could be demonstrated in the excerpt taken from the transcription:

Teacher: The second one is the starfish jump. Be careful with your partner. Look at the example, 1, 2, 3, 4, 5 ... .10. Now faster ready?1,2 ... .10.

Observation: Most of the guys were making jokes with each other and running around outside the circle). **DISENGBOYS.**

Teacher: Now, make groups of four girls each one.

Observation: Girls were jumping but boys were playing or running **DISENGBOYS** Girls shouted and jumped happier EMOIDENT-GIRLS.

(Classroom interaction, Session 1, vestibular).

The first activity also generated social engagement SOCENG code, as students discussed and compared their performance with their peers throughout the exercises. Movement and balance tasks were easier for some students and more challenging for others, generating moments of individual emotional engagement when they succeeded or won. Those who struggled were supported and encouraged by their peers, and all students completed the activity with effort and persistence, activating behavioral-cognitive engagement BEHAVECOG code as shown in the excerpt of the transcription:

Observation: Most of them found it difficult to exercise, however, they started over **EMOCOG- BEHAVCOG.** Everyone started to stand up to perform the exercise. The teacher made the recommendation to wait for the turn. They waited. BEFOLLOW **SOCENG.**

(Classroom interaction, Session 2, vestibular)

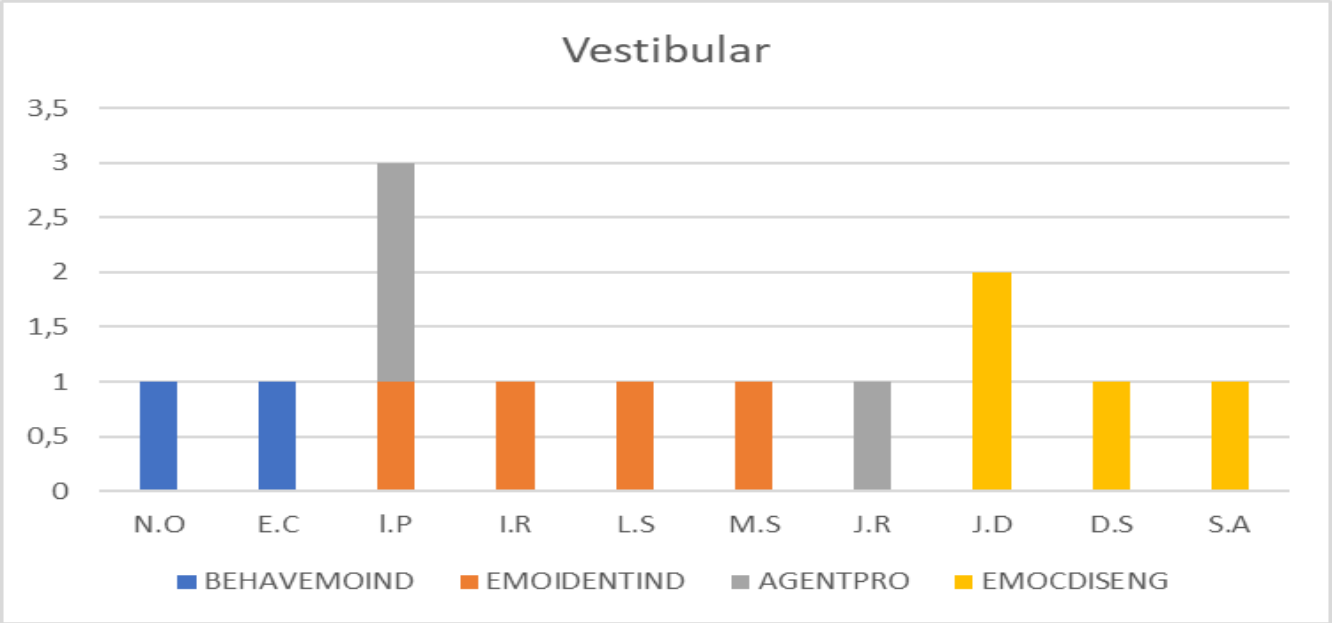
Similarly, when mixed activities were carried out (for instance, the rope strength task), half of the group tended to become distracted rather than attending to the activity, reflecting moments of external or socially driven disengagement with the code DISENGEXT. This was revealed in the transcribed excerpt "The final groups were playing some of them were playing and didn't pay attention to the competition". (Observation, Session 2). Implementing additional strategies, such as mixed-gender grouping may help minimize these disengagement episodes, taking into account that at this age they are strongly influenced by the motivations of the other and are discovering themselves from the interaction with the other, as Gardner (1983) mentioned about middle-childhood population "There are continuing trends toward greater social sensitivity, toward a keener sense of another's motivations, and toward a fuller sense of one's own competences and lacks" (P. 264).

During these activities, boys displayed a higher degree of behavioral disengagement (e.g., difficulty following instructions) and external-social disengagement (e.g., getting distracted by games or outside stimuli) compared to girls. Finally, two students were observed suggesting ideas and modifications for the activities, activating emotional-cognitive AGENTPRO code, when the students L.P and J.R stated their idea "Ahora los que ganaron que compitan entre ellos" (student L.P, Session 2) -"Ms. todo el salón contra todo el salón" (student J.R, Session 2).

Individual Findings Vestibular

Figure 16

Individual activation rate of types of engagement and disengagement.



Note: Own elaboration

The students J.R, L.P let the teacher know what they wanted and tried to personalize or improve the activity, activating the AGENTPRO code, as documented in this section of the transcription "¿Y si intentamos con un zapato?" (student L.P, vestibular excerpt, session #1). They usually do not participate or give these kinds of suggestions. JD, S.A and D.S, on the contrary, generated emotional disengagement when they lost the game or were unable to complete the activity, leading to frustration or disengagement from it. They have excelled in other sessions, reflecting that these activities were not part of their strengths. D.S reflected disengagement and N.O and E.C were quite touched emotionally when they won during the game, claiming they were happy because they could excel in English class, as the transcribed excerpt suggested "the student E.C put various objects on his head very happy and focused" (Observation, vestibular excerpt, session #1).

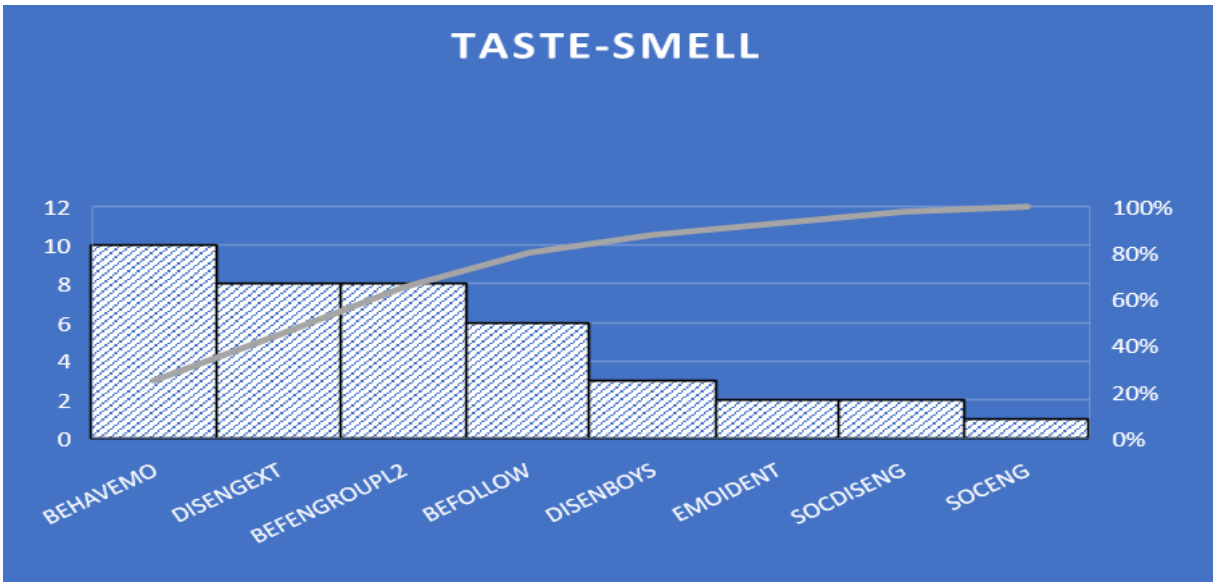
It was evident that these activities posed a challenge for many students, with some excelling while others had to confront their own limitations. Thus, it can be affirmed that implementing vestibular activities in EFL classes not only strengthened balance and postural stability but also stimulated the cognitive and emotional processes that underpin classroom learning, such as attention, memory, and self-regulation. As Božanić, Battelino and Vozel (2024) affirmed, Proper vestibular stimulation influences homeostatic regulation, cognitive processes, emotional responses, and autonomic functioning, and the vestibular system is closely linked to attentional and memory mechanisms involved in learning.

4.4.5. Taste-smell

This section reports the descriptive findings derived from the taste-smell sessions. Detailed information about the activity guide used during this section can be accessed through the hyperlink (see activities guide).

Figure 17

Collective activation rate of types of engagement and disengagement.



*Note: Own elaboration***.**

In both sessions there was great astonishment and surprise regarding the activities proposed, activating the code EMOIDENT. This generated constant socialization that enriched the experience and showed clear enthusiasm and enjoyment of the task, which is represented in the code BEHAVEMO, as illustrated in the excerpt from the transcription:

Teacher: I brought three different essences.

Comments (Group response): Siii! EMOIDENT

Teacher: Yummy?

Comments (Group response): Yummy!! EMOIDENT BEHAVEMO

Comments (Group response): They were laughing and talking BEHAVEMO

(Classroom interaction, Session 2, taste and smell)

However, this also led to less follow-up of the given instructions due to distractions with the materials and continuous chatter, especially among the boys. Their behavior such as pretending to hang classmates with the band, exaggerating the mixing until spilling, or making jokes to the partner who could not see, reflected what was captured in the code DISENGEXT and more specifically in DISENBOYS, as demonstrated in the excerpt taken from the transcription:

> **Observation:** They carry out the activity; however, distractions are observed due to external elements, such as playing with the blindfolds and the spoons, and some groups making jokes toward the peer who has their eyes covered.) **DISENBOYS- DISENGEXT**

(Classroom interaction, Session 1, taste and smell).

Taking into account what Piaget's theory states (1971) about transforming abstract knowledge into concrete experiences, the use of elements with different olfactory and gustatory characteristics made these concepts tangible for students. This allowed direct connections to the vocabulary to emerge; most students used the vocabulary spontaneously or asked about it to apply it. This situation activated the code BEFENGROUPL2, which refers to the collective use of English in class, this was observed in the following transcription excerpt "After a while they take their pancake and add toppings asking for them in English" (observation label, Session 2, taste and smell).

Likewise, these sessions showed an increase in students' curiosity, promoting greater socialization and experimentation, and generating moments of collaborative learning as they corrected or supported each other. At times, however, this same curiosity led to moments of disconnection or brief disengagement when they used class materials for playful interactions with peers, which aligns with the code SOCDISENG and DISENGEXT. This should not be perceived as negative for the English class; on the contrary, it demonstrates their curiosity to socialize what they were experiencing and how they felt throughout the activity. Their emotional engagement was clearly strong, activating both SOCENG and EMOIDENT. The challenge now is to design strategies that channel this energy in ways that strengthen agentic and cognitive engagement and help reactivate behavioral engagement in a more focused manner. This was observed in the following transcribed portion:

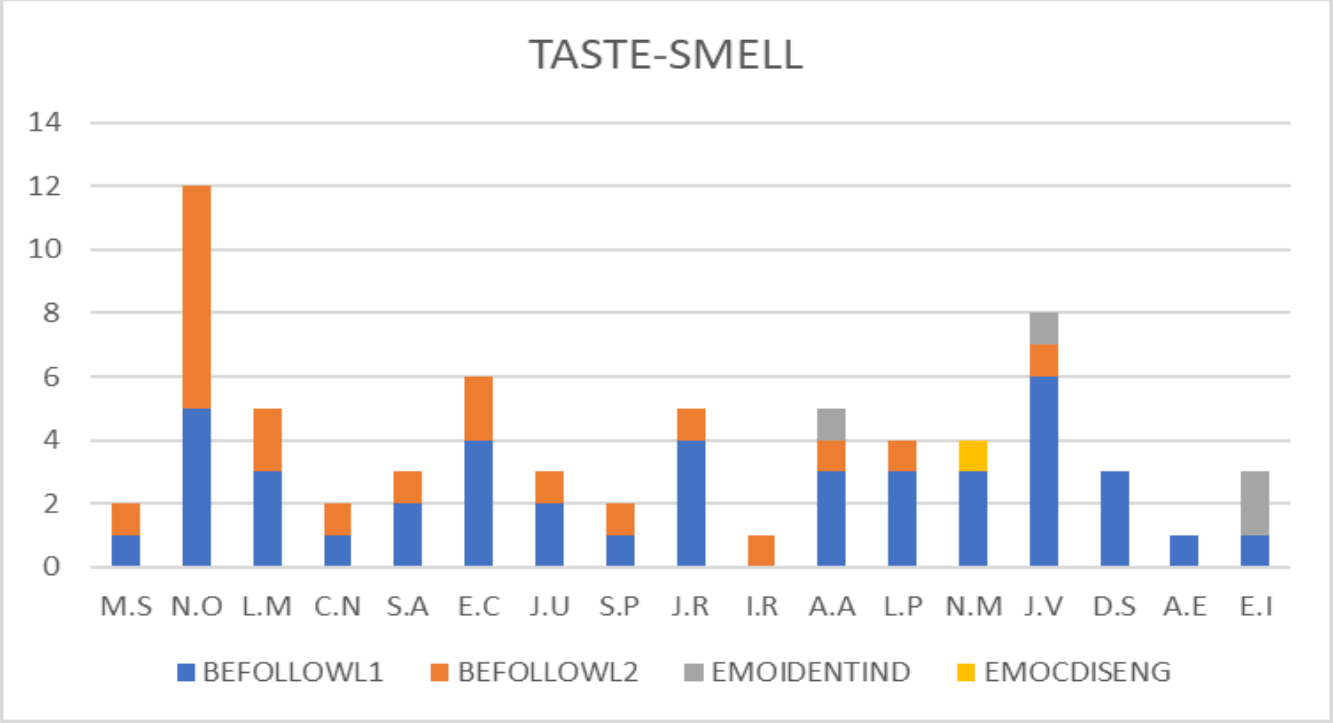
> **Observation:** They were talking while they were covering their eyes) **SOCENG**
>
> **Student C.N:** (approaching to look at the bag with the food) **DISENGEXT**
>
> **Student L.M:** Ms. yo voy a ser la primera que va a participar. **EMOIDENTIND**
>
> **Teacher:** Ready guys? Ok. Let's start. Be honest.
>
> **Observation:** They were distracted laughing and talking. **SOCDISENG DISENGEXT**
>
> **Teacher:** Ok the first one. You need to help the person in order to smell and eat.

(Classroom interaction, Session 1, taste and smell)

Individual Findings Taste-smell

Figure 18

Individual activation rate of types of engagement and disengagement.



Note: Own elaboration.

There was evidence of a greater participation output in the foreign language by students at the general level with 6 times and individual level with 13 times. Students who usually do not participate in other activities neither in their native language nor in Spanish, were now doing it and in the foreign language (1 M.S, 4 N.O, 2 L.M, 1 CN, 1 S.A, 1E.C, 1 J.U, 1 S.P, 1J.R, 1 I.R) as highlighted in the transcription fragment "N.O: Acido. Sour- S.A: Ms this is the cinnamon" (taste-smell excerpt, session #1 and 2).

Although most of the students were excited during the activities proposed, J.V, A.A, E.I

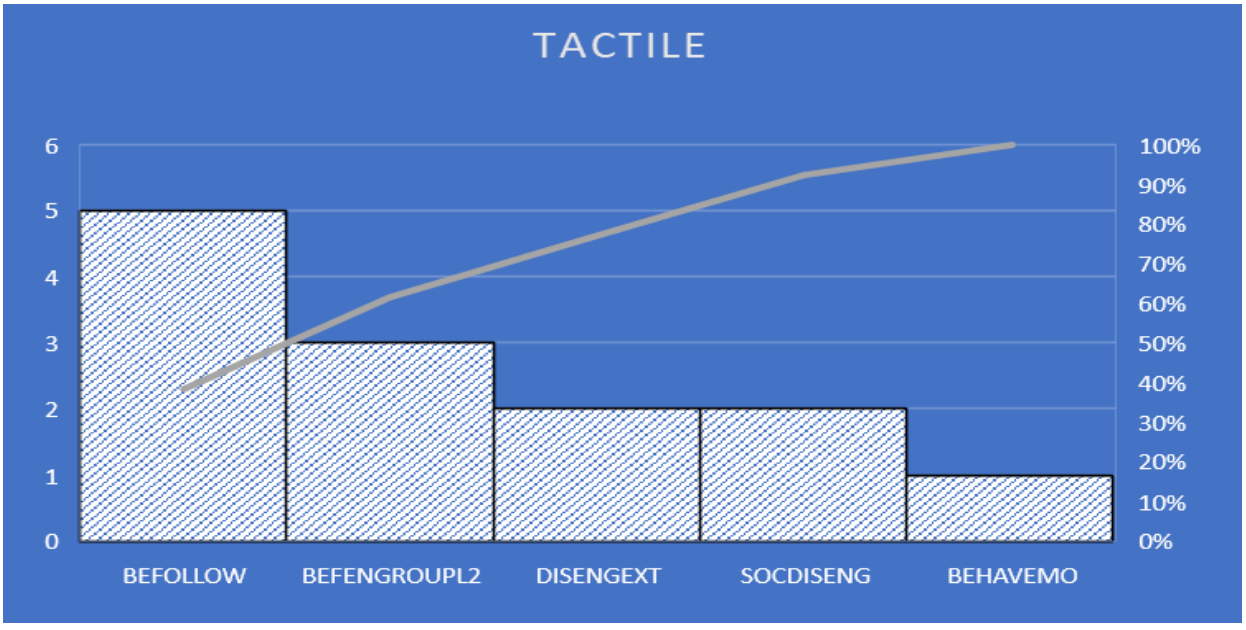
claimed to have had a good time during the sessions and even thanked the teacher for the activity. Besides, N.M showed disengagement because he could not work with other classmates which led him to abandon the activity momentarily; at the end, he retook his participation. It was evident that students' participation in both their mother tongue and the target language increased when they felt they were experimenting and actively taking part in the activity. As Wenger (1998, as cited in Pink, 2015) claims, knowing is specific, active, and experiential (p. 39).

4.4.6. Touch sessions

This section reports the descriptive findings derived from the touch sessions. Detailed information about the activity guide used during this section can be accessed through the hyperlink (see activities guide).

Figure 19

Collective activation rate of types of engagement and disengagement



Note: Own elaboration.

It was clear that everyone could participate in the activities proposed and had to guess the elements. There was collaborative work not only in passing the containers but also in supporting the vocabulary and pronunciation of each element, activating the code BEFOLLOW and reinforcing the collective use of English represented in the code BEFENGROUPL2. Most of the teams followed the instructions, and there was evidence of collective work between boys and girls, making this session socially enriching. This was revealed in the transcribed data:

> **Teacher:** Carton, very good. If he doesn't know how to say it in Spanish caja, you are going to help them look at the screen and tell them… carton. Ok? But let's start, that was the example. Did you understand?
>
> **Comments (Group response):** yes! BEFENGROUPL2
>
> **Teacher:** Please find a carton of juice. Go, touch. On the table
>
> **Observation:** They were touching and walking blindfolded around the classroom. BEFOLLOW

(Classroom interaction, Session 2, Touch)

At the end of the first session, a general distraction was generated by the class elements, showing evidence of external disengagement through DISEGEXT code and moments of social disengagement reflected in the code SOCDISENG. This final part could be considered more focused, where students completed the activity properly according to the instructions given, as documented in this section of the transcription:

> **Observation:** At the end of the activity most of them were playing with the objects. **SOCDISENG DISENGEXT**

Teacher: You are going to search for a can ok?

Observation: Several students make noise and whisper distracted with the elements on the table. **DISENGEXT**

Teacher: Don't speak because they could identify the place easily with the sound.

(Classroom interaction, Session 1, touch).

In the second session, there was an increase in cognitive participation COGIND, with students asking curious questions about people with visual and hearing impairments. Emotional-behavioral participation also increased, activating the code BEHAVEMO as students expressed enthusiasm and enjoyment, as illustrated in the excerpt from the transcription:

Teacher: Please find a carton of juice. Go, touch. On the table

Comments (Group response): Ms. yo quiero, Ms. puedo yo! BEHAVEMO

Student J.U: Ms. Una pregunta. ¿Un niño como puede estudiar siendo ciego, sordo y mudo? COGIND

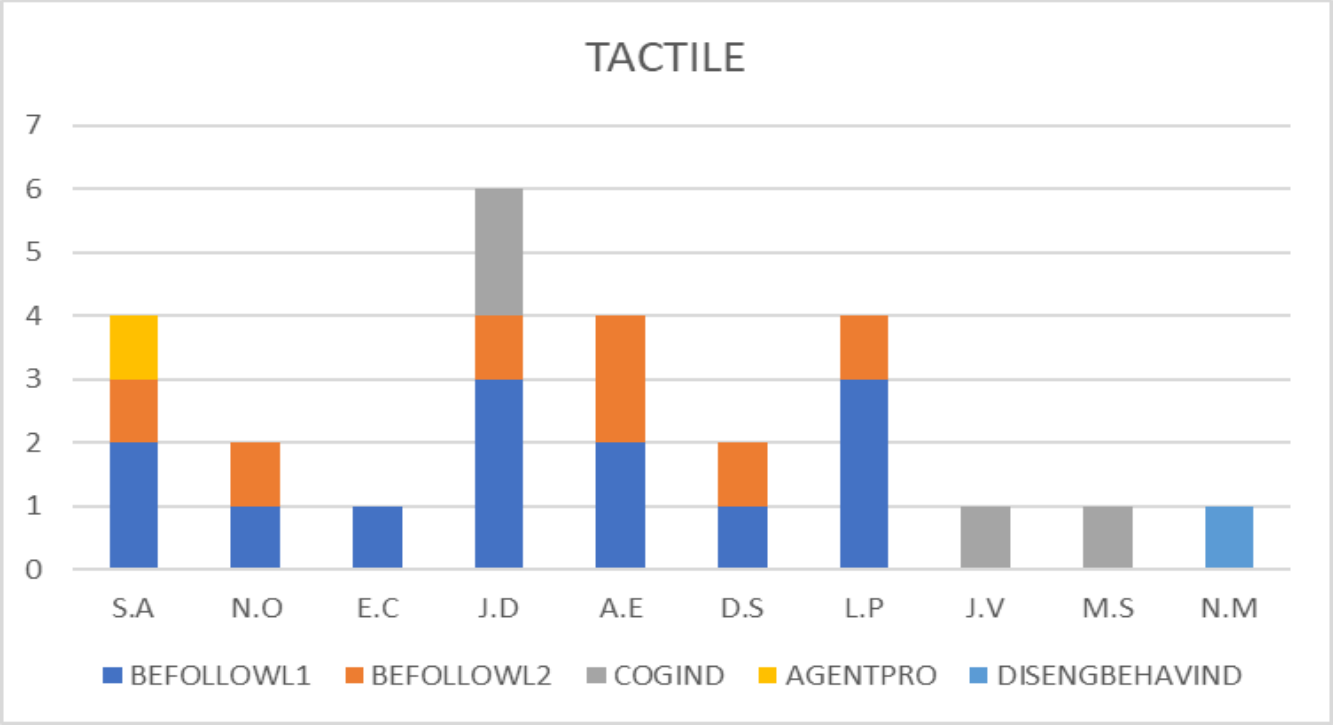
(Classroom interaction, Session 2, touch)

These sessions allowed to open a field of reflections about the different ways of identifying and interpreting the world different from the two most predominant channels (sight-hearing), through the perception, that is embodied as Merleau-Ponty, M. claimed "the body is our general medium for having a world" we must pay attention to embodied, sensory modes of knowing in order to comprehend the experiences of others. (1962, p.169).

Individual Findings Touch

Figure 16

Individual activation rate of types of engagement and disengagement.



Note Own elaboration.

Although most students followed the instructions and attempted to use English with their classmates, the students S.A., N.O., J.D., A.E and D.S. L.P. demonstrated more frequent use of the target vocabulary. Notably, S.A. suggested adapting the activity by incorporating a mystery box, reflecting agentic engagement with the AGENTPRO code as the transcription sample demonstrated “Juguemos a la gallinita ciega, yo tengo la venda o juguemos a la cajita misteriosa.” (Student S.A.tactile excerpt, session #1).

Disengagement was observed only in N.M, who moved between groups, altered instructions, or engaged in unrelated conversations. He stated that he did not want to participate in the activity that required covering his eyes. It is important to note that during this week, five students were absent due to medical leave. Thus, the sessions were conducted with only fifteen students. Nevertheless, there was a surprisingly higher level of participation in the target language among students who typically do not engage actively in conventional English classes, such as A.E., D.S., and L.P, as evidenced in the transcription excerpt "A.E: Change the person- N.O: It is a packet". (Tactile excerpt, session #1).

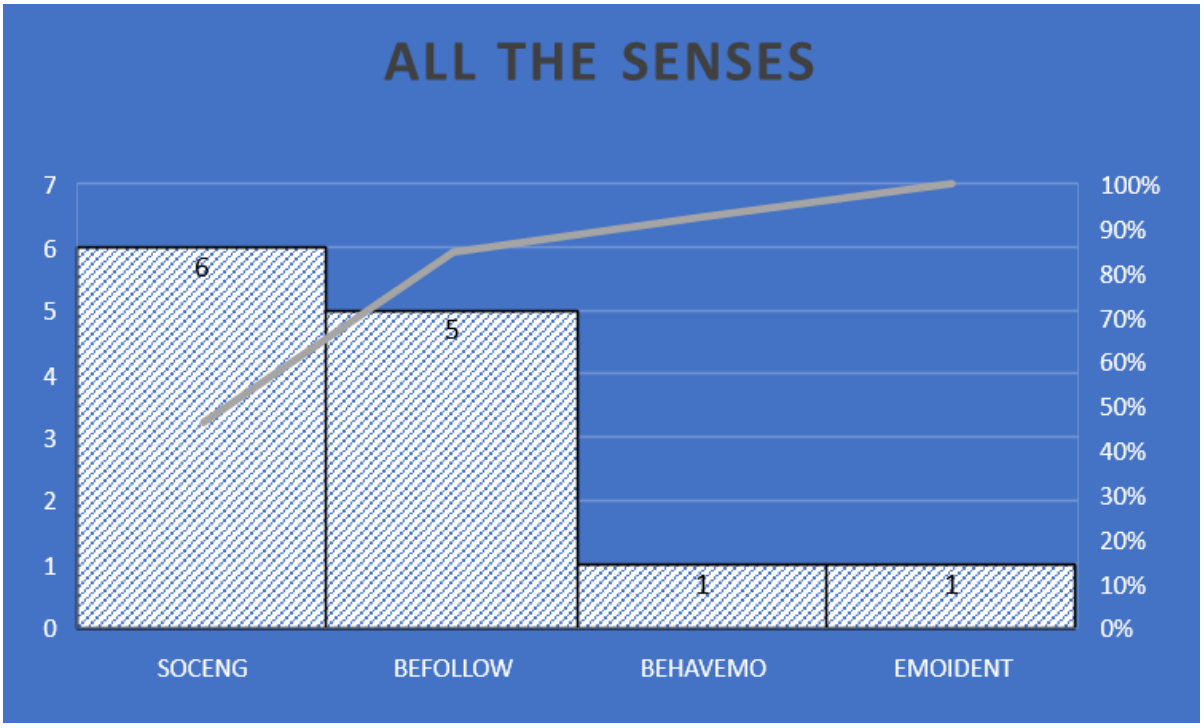
These sessions appeared to foster greater curiosity, empathy and linguistic awareness through an approach markedly different from traditional instruction, where such activities are often considered "inappropriate" or are reserved exclusively for populations with visual impairments who rely more heavily on the tactile modality. As Gardner (1983) claimed, Formal schooling often emphasizes abstract subject matter that is inaccessible through direct sensory experience, relying mainly on visual input through reading. Learners who adapt successfully to this system become used to addressing tasks that are presented without meaningful context and to solving them as routine academic requirements.

4.4.7. All the senses sessions

This section reports the descriptive findings derived from the sessions "All the Senses." Detailed information about the activity guide used during this section can be accessed through the hyperlink (Activities Guide).

Figure 20

Collective activation rate of types of engagement and disengagement.



*Note: Own elaboration***.**

The final session, in which all the senses were involved, was calmer, generating less anxiety and greater individual concentration. This may have been facilitated by the fact that each student had to freely accomplish a final goal using different materials, activating the code BEFOLLOW.

Both behavioral engagement and emotional engagement were activated, and a reduction in anxiety levels was observed, activating the code EMOIDENT, which favored following instructions and socializing around certain ideas or points of view, thus activating social engagement SOCENG code. Moments of discussion arose among the students about the artistic component, their tastes, and their beliefs such as whether aliens exist or not, which allowed them to express and recognize different or similar preferences, thereby activating BEHAVEMO, as reflected in the portion of the transcription:

Teacher: Today we are going to create our own alien.

Observation: They looked each other and smile **EMOIDENT**

Teacher: You are going to ask yourself these questions. How many ears, hands do you want to put to your alien. Or, if you don't want it to have hands.

Observation: Everyone asked those questions orally.BEFOLLOW

Student J.V: No, Ms, estaría manco

Observation: Some laughs **SOCENG**

Teacher: Okay, everyone, since we are testing samples of exotic sweets, let us try this one. Tell me if you like it.

Observation: They taste it; some react with pleasure, while others show dislike.

Comments (Group response): No. yes! Ms, se puede repetir? (the candy)

BEHAVEMO

Teacher: I'm gonna taste it...mmm it tastes like tamarindo. Delicious

Comments (Group response): A mí me gusta el tamarindo pero en jugo, a mí no me gusta el tamarindo **SOCENG**

Student J.D: May I borrow your scissors? BEFOLLOW

Teacher: Off course

Observation: They talk to each other, very focused and busy in the activity **SOCENG**

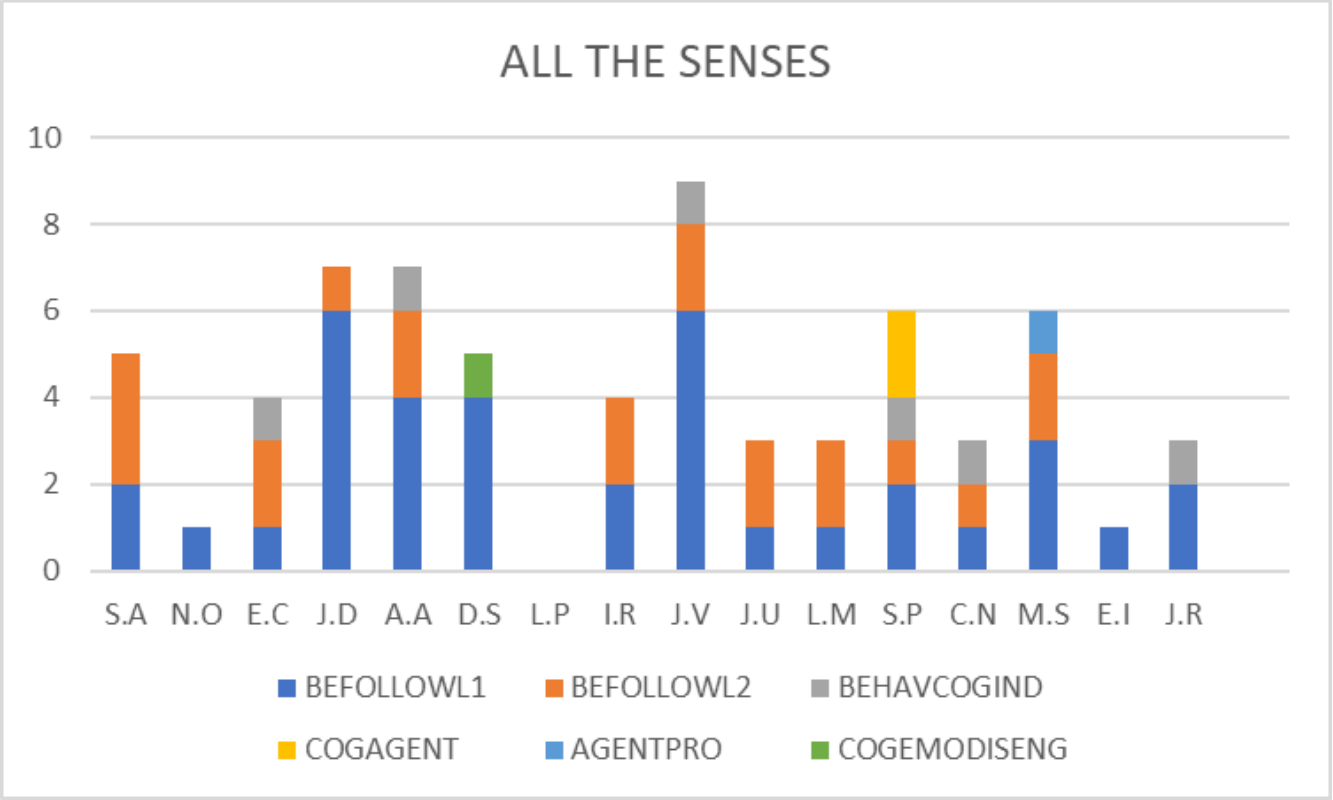
(Classroom interaction, "all the senses" Session).

In contrast to other sessions, such as the vestibular or taste-smell sessions, the external materials brought to class for the artistic task did not cause distraction; instead, they promoted the use of the foreign language. This may have occurred because they were quite focused, working with a greater effort to complete the challenge. In this session, it became evident that low anxiety significantly reduced behavioral and emotional disengagement, creating the ideal environment for more natural input. This aligns with Krashen's third variable related to success in second language acquisition, which states that "Low anxiety appears to be conducive to second language acquisition, whether measured as personal or classroom anxiety" (1981, p. 31).

Individual Findings "All the senses" session

Figure 21

Individual activation rate of types of engagement and disengagement



Note: Own elaboration.

This was one of the sessions where most of the students were behaviorally engaged, expressing themselves quietly. E.I, A.A, J.R used just their native language. But, most of the students increased their use of English when they asked or needed something.

The use of English when they asked or needed something increased. Some students that usually do not use English at all use words or phrases (J.V, M.S, E.C, S.P, A.E, L.M, I.R) as highlighted in the transcription fragment "E.C: Ms. yo necesito foamy… I need foamy…two please" (All the senses" session excerpt).

Students that usually did not show their work or did not approach the teacher started to do so such as S.P or J.R. A notable finding is that these students demonstrated higher engagement during artistic tasks, such as drawing and coloring, indicating a clear preference for activities involving creativity and working with different textures. Additionally, S.P. actively asked for help, being something unusual in the student, reflecting agentic engagement, as indicated by the excerpted transcription "S.P: Ms. no entendí nada, help" (All the senses" session excerpt). It was evident that students who typically did not approach the teacher or present their work voluntarily did so during this session and were behavioral and emotional engaged, showing enthusiasm and enjoyment of the task in a lowered anxiety environment, where they were not under time pressure by the teacher nor required to submit completed worksheets, which activated the BEFOLLOW and BEHAVEMO codes. These findings align with the conception of an ideal language teacher as proposed by Krashen (1982). According to his second language acquisition theory, the ideal teacher "is someone who can provide input and help make it comprehensible in a low-anxiety situation." (p.32).

4.6. Collective and Individual Output

The collective output, evidenced in most of the sessions, showed group-level use of the foreign language. This occurred for various reasons. For example, when students collectively

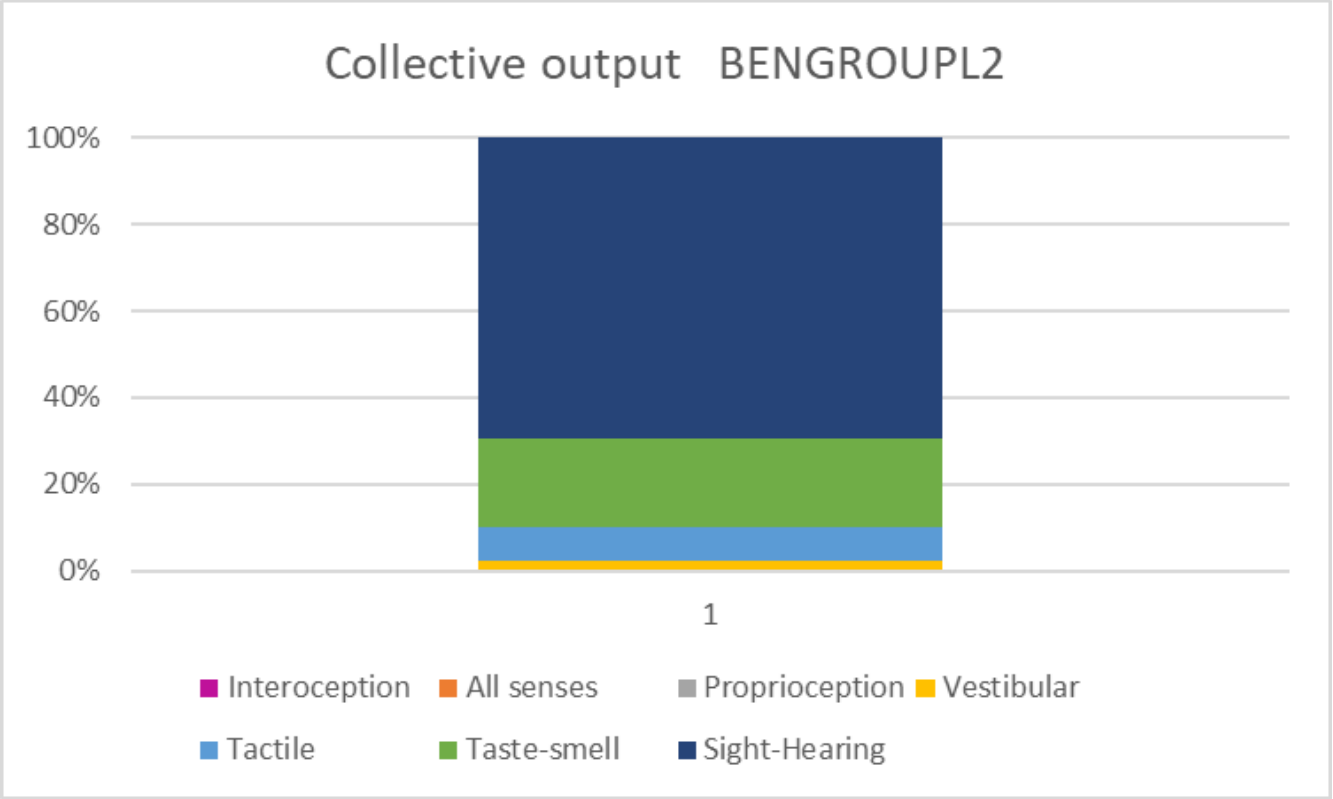
knew the answer to an activity and responded in unison, or when they shared the same sensory perception and found the same answer as a group. As shown in the following figure, the session that demonstrated the highest level of collective output in English was sight–hearing, with 27 group interventions. This may have resulted from several factors. One possibility is that the planned activities created greater opportunities for collective participation. Another reason may be the predominance of the visual and auditory senses in this society

In line with Majid and Levinson (2011) language is usually transmitted exclusively through acoustic and visual modalities (p. 7). This means that learners receive linguistic input primarily through what they hear and see, which enables them to construct similar or shared interpretations of the same auditory and visual stimuli. Additionally, they are familiar with learning frequently through these two channels. A final factor may have been the use of the textbook in those sessions, which enabled students to focus on the same point, image, or answer option, thus facilitating identical or similar responses as a group.

The sessions with the next highest levels of group participation were taste-smell (8), tactile (3), and vestibular (1). The sessions in which no collective output in the foreign language was observed were proprioception, interoception, and all the senses. Nevertheless, in these sessions, a high level of individual participation in English was observed, particularly in the all the senses session.

Figure 22

Collective output in the EFL



Note: Own elaboration.

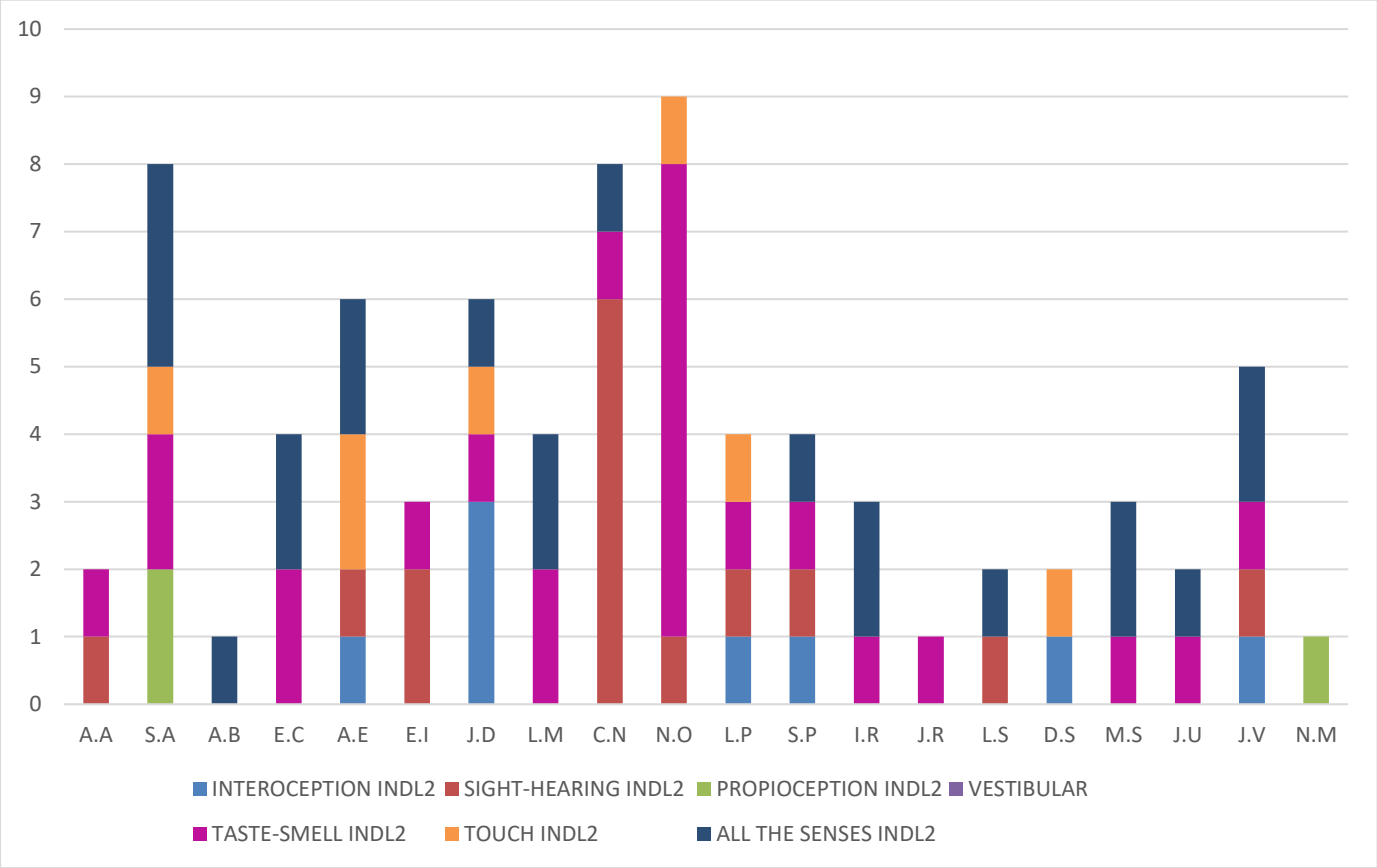
In the following graphic, individual output is shown, that is, the oral production generated autonomously by students, without being prompted to use the foreign language or pressured by the dynamics of the proposed activities. Separated from collective output, which was tagged with the BENGROUPL2 code, individual output used the BEFOLLOWL2 code. It was observed that certain sessions elicited higher levels of individual oral participation in the foreign language. The sight-hearing sessions generated individual output in 9 students, touch in 6 students, and all the senses activated output in 13 students.

The proprioception sessions did so in only two students, while the taste-smell sessions

elicited individual output in 15 students, making them the sessions that generated the highest amount of individual output in English. These results aligned with the importance of fostering greater exploration and student participation in the real world through their senses. Although the EFL classroom cannot fully replicate the natural environment of the outside world, its purpose, as Krashen (1982) asserted, "is to bring students to the point where they can begin to use the outside world for further acquisition, where they can begin to understand the language used outside" (p. 59). Understanding does not rely solely on reading or listening but also on bodily and sensory interaction in real-life situations (e.g., smelling, tasting, moving, and feeling). Thus, the multisensory activities developed during the sessions supported the transition from controlled classroom language to meaningful communication in everyday contexts.

Figure 23

Individual output in the EFL.



Note: Own elaboration.

4.7. MAEQ Questionnaires Findings

Several studies have shown that questionnaires are not always the most accurate or reliable instruments for use with children in middle childhood (approximately ages 7-12). Although questionnaires can be useful and appropriate, their effectiveness depends on multiple factors, as they may be affected by recall bias, social desirability, and misunderstandings of item wording. In the research context, some students omitted

responses or selected more than one option for certain items. Moreover, questionnaires rarely capture the full complexity of behavior in naturalistic settings. For example, the self-report version of the Strengths and Difficulties Questionnaire (SDQ) indicated that "the reliability of the self-report SDQ was somewhat less satisfactory in the younger children of our sample" (Muris et al., 2004, p. 447). These authors highlighted difficulties related to children's comprehension of questionnaire items and developmental aspects of self-concept, and they emphasized the need to complement self-report measures with additional methods. Similarly, Beitchman and Corradini (1988) identified limitations associated with children's cognitive and emotional development and recommended the use of multiple instruments (p. 445). For this reason, the present study employed three different instruments.

In contrast, other authors have argued that during middle childhood, children are increasingly capable of recognizing and reporting their own emotions, internal states, and observable behaviors. For instance, Marci et al. (2021) maintained that questionnaires constitute a valid tool for capturing consciously accessible aspects of attachment organization (p. 648). In this study, the questionnaire was therefore considered both a complementary and a key instrument for documenting students' perceptions of the sessions conducted

4.7.1. Interoception MAEQ findings.

The statements with the most affirmative responses were items 4, 5, and 2: "I am learning new things in the multisensory sessions", "I think learning English through multisensory activities is interesting", and "It was easy to pay attention and make an effort in the multisensory activities". This showed that, in the first approach to the multisensory

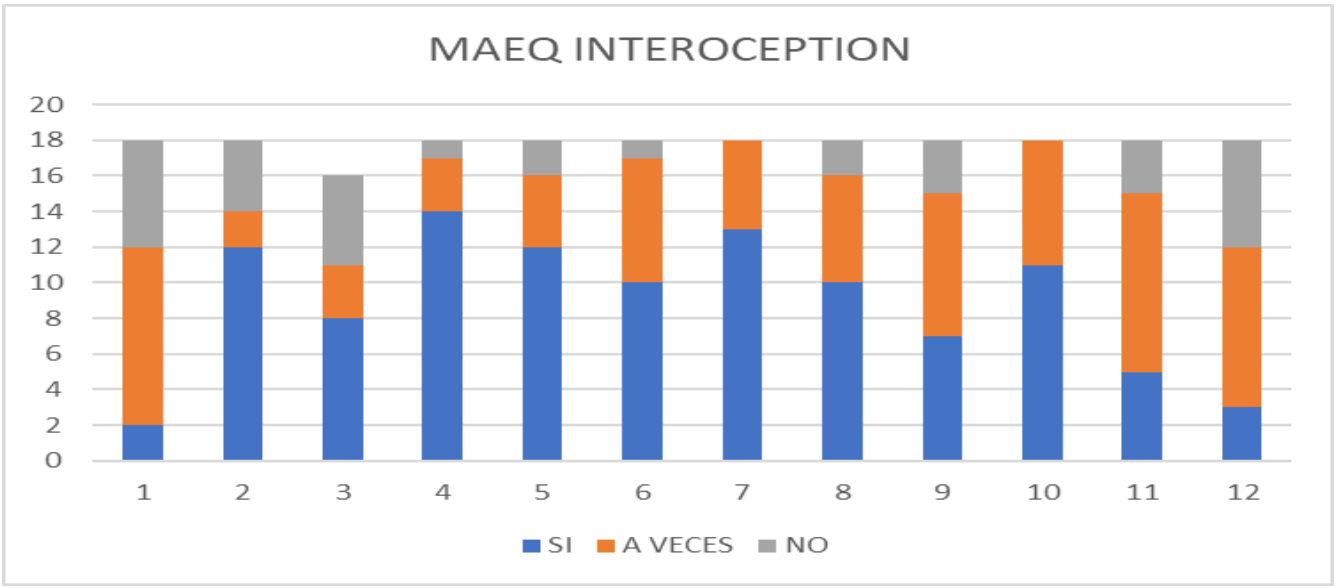
sessions, most students perceived that they learned new things, found learning English through their senses interesting, and found it easier to pay attention during these two sessions. Because of this, the dimension most frequently activated with "yes" and "sometimes" responses was the emotional one. The most diverse dimension in its responses, and the least focused on a specific pattern, is the behavioral one, with 26 "yes," 34 "sometimes," and 12 "no" responses. This reflects uncertainty in some students' perception of their own work, as to whether they worked consistently on the activity, paid attention, and participated actively.

The two statements that received the most "no" responses, especially in vestibular, proprioception and interoception senses, were item 1 "I used the English vocabulary about the senses in the sessions" and item 12 "I constantly asked questions during the sessions". This may be due to the nature of these sessions, which focused more on self-discovery of the body (breathing, heartbeat, muscles, mind) than on their oral participation. As evidenced in the literature on engagement in authors such as Fredricks (2004) emotion and motivation strongly influence not only language acquisition but also students' overall participation in class.

These sessions, which incorporated an interoceptive focus (e.g., mindfulness and body-awareness exercises), as stated by Matiz, A. et al (2024) were associated with enhanced emotional regulation and well-being (p.6). Thereby creating more favorable conditions for language learning. In doing so, they contributed to improving learners' emotional engagement and reducing their anxiety.

Figure 24

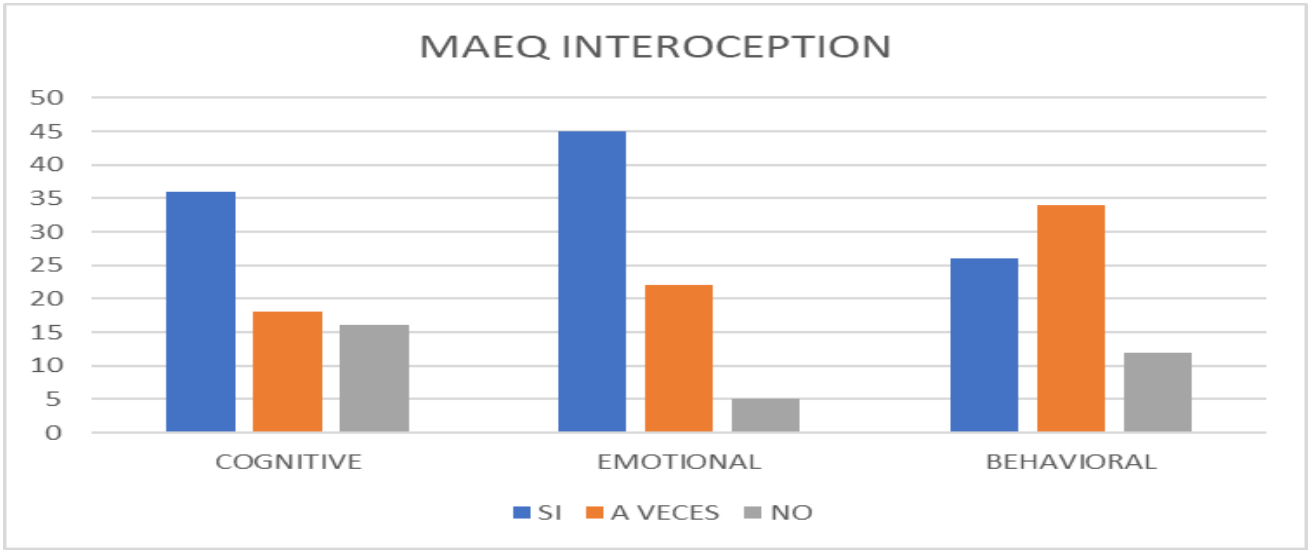
MAEQ Interoception Results for Each Question.



Note: Own elaboration.

Figure 25

MAEQ Interoception Results for Each Dimension.



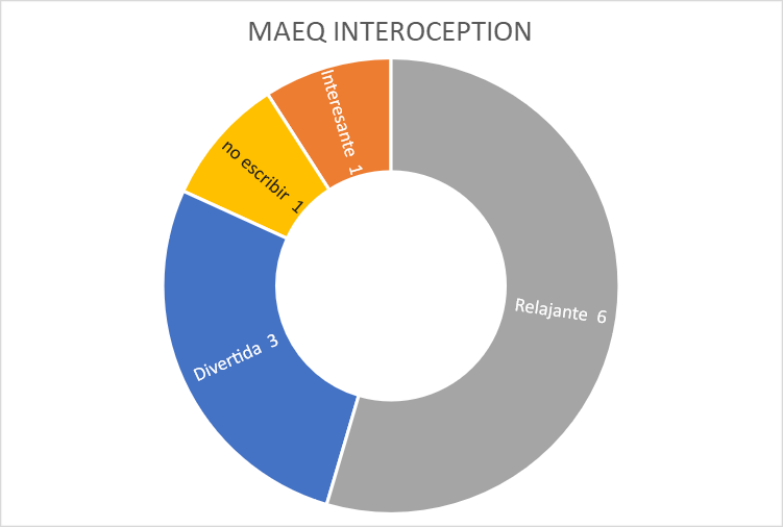
Note: Own elaboration.

Interoception Open-ended Questions

Overall, the results point to the potential of the interoception sessions to foster a shift in students' attention from external environmental stimuli toward internal bodily perception, although this process appeared to vary across participants. Seventeen of the nineteen students stated that they liked one of the sessions carried out (spa session). Although not all of them wrote the reasons, six said that the activities were relaxing, three said they were fun, one found them interesting, and one said they liked it because it was not a written activity. The activities they liked the most were spa session (8 students) exfoliation (4) and heartbeats measurement (2).

Figure 26

Open question Interoception Results.



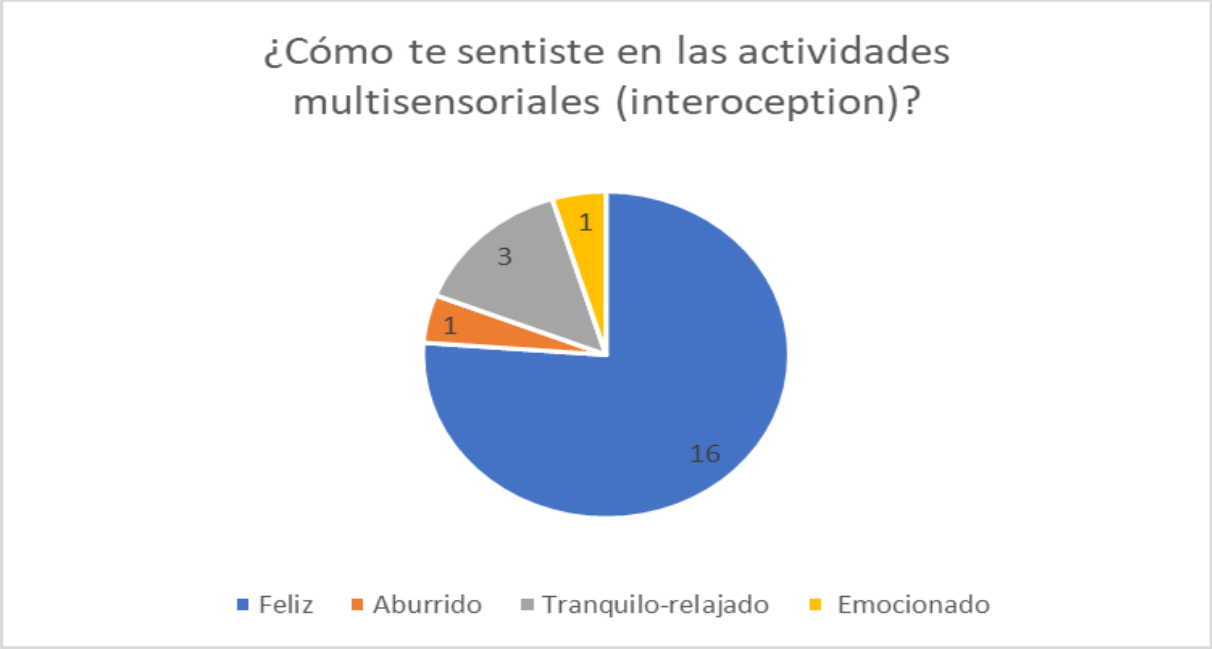
Note: Own elaboration.

These results showed that the interoception sessions were successful in their goal of quieting the outside world so students could listen to their inner selves (their own bodies). This lowered their anxiety levels, allowing them to feel more relaxed, calm, and happy. Despite perceiving their oral participation as limited, students reported learning new aspects of their own

bodies through English. In this context, linguistic input played a central role, consistent with its importance in the process of language acquisition (Krashen, 1982, p. 10).

Figure 27

Open-ended question. Interoception results.



Note: Own elaboration.

4.7.2. Sight- Hearing MAEQ findings

The statements with the most "yes" responses were items 4, 5, and 8 "I am learning new things in the multisensory sessions", "I think learning English through multisensory activities is interesting", and "I connected easily with the proposed activities". The statements with the highest "no" or "sometimes" were the item 1 (4 no, 8 sometimes, and 8 yes) "I used the English vocabulary about the senses in the sessions" and the item 12 (7 yes, 4 sometimes and 9 no) "I constantly asked questions during the sessions".

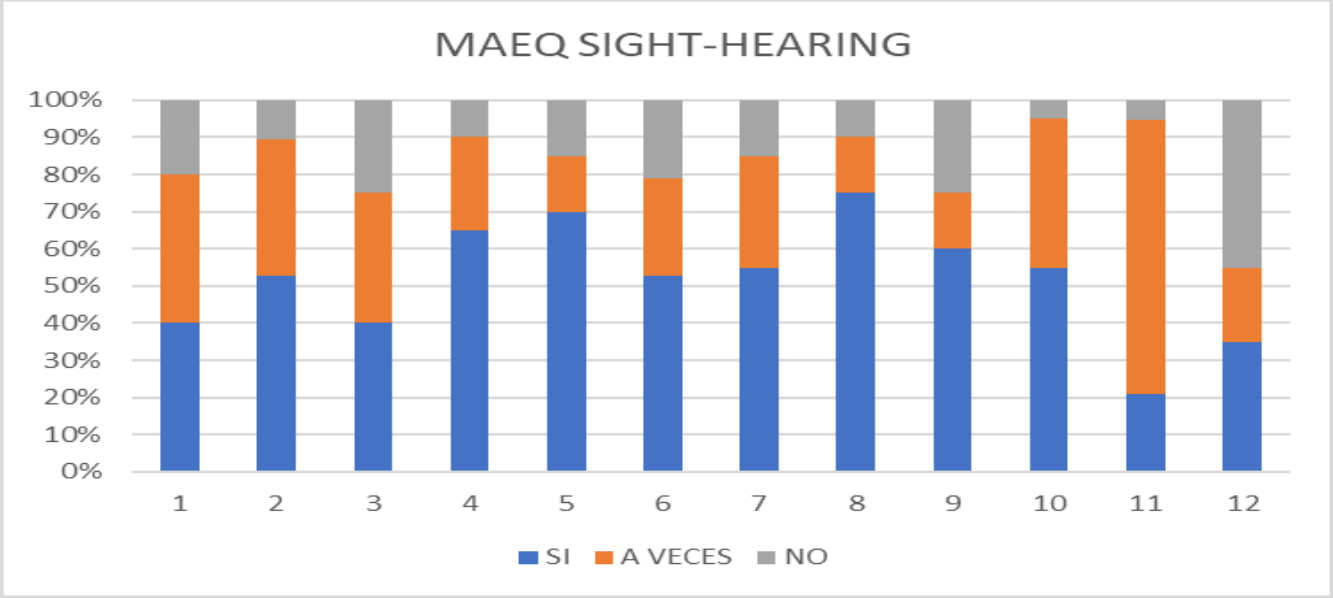
The item with different types of answers of diverse response frequency was number 3: "I was able to express myself easily with my ideas and my body" (8 yes, 17 sometimes, and 5 no).

This sight- hearing questionnaire showed that they felt they were indeed learning new things through the sessions, found them interesting, and were therefore able to connect with the activities, which was reflected in their strong emotional response (laughing, screaming, smiling). This occurred even though most students stated that they did not ask questions or participate consistently during the sessions, making the behavioral item the least defined and revealing a lower perception of their participation and ability to follow instructions. Likewise, because the activities did not focus on movement but rather on vision and hearing, students perceived that they were not able to express their ideas through their bodies.

It was evident from the students' responses that their self-perception of participation and use of the foreign language through sensory channels decreased. This outcome may be attributed to the focus of these sessions, in which greater priority was given to the "higher senses," namely sight and hearing (Majid, 2011, p. 7), resulting in fewer kinesthetic or experiential activities involving other sensory channels such as touch, taste, and smell.

Figure 28

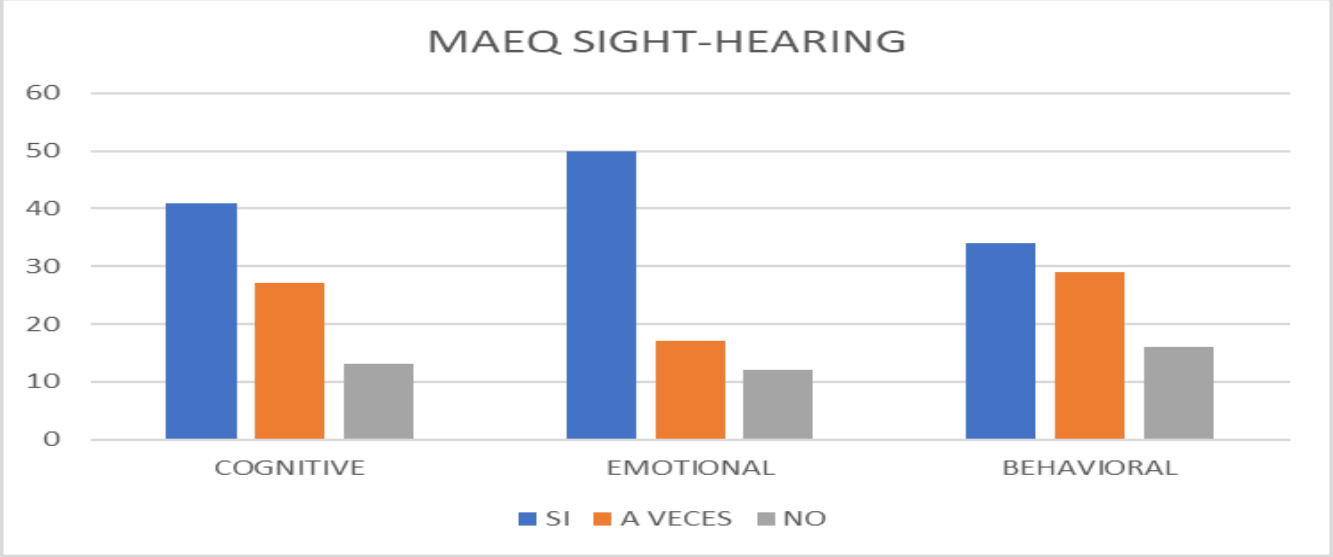
MAEQ Sight-hearing results for each question.



Note: Own elaboration.

Figure 29

MAEQ Sight-hearing results for each dimension.



Note: Own elaboration.

Sight- Hearing Open-ended Questions

Fourteen of the nineteen students stated that they liked the activities. In their written reasons, they mentioned that they found them fun and interesting, they liked the topic, the 4K videos, and the real and enhanced audio. Of the five students who said they did not like one or several activities from the sessions, they explained in their reasons "I didn't like any of them", "We used the book" "I felt like I was in a normal class, just with less light" "I dislike the part where we had to write on the book". This made it clear that some students perceived both the senses of sight and hearing, as well as the book activities, as a traditional class or as lack of novelty compared to the audiovisual input they are usually exposed to in their daily lives. It also showed that some students expressed dislike toward the writing tasks.

Figure 30

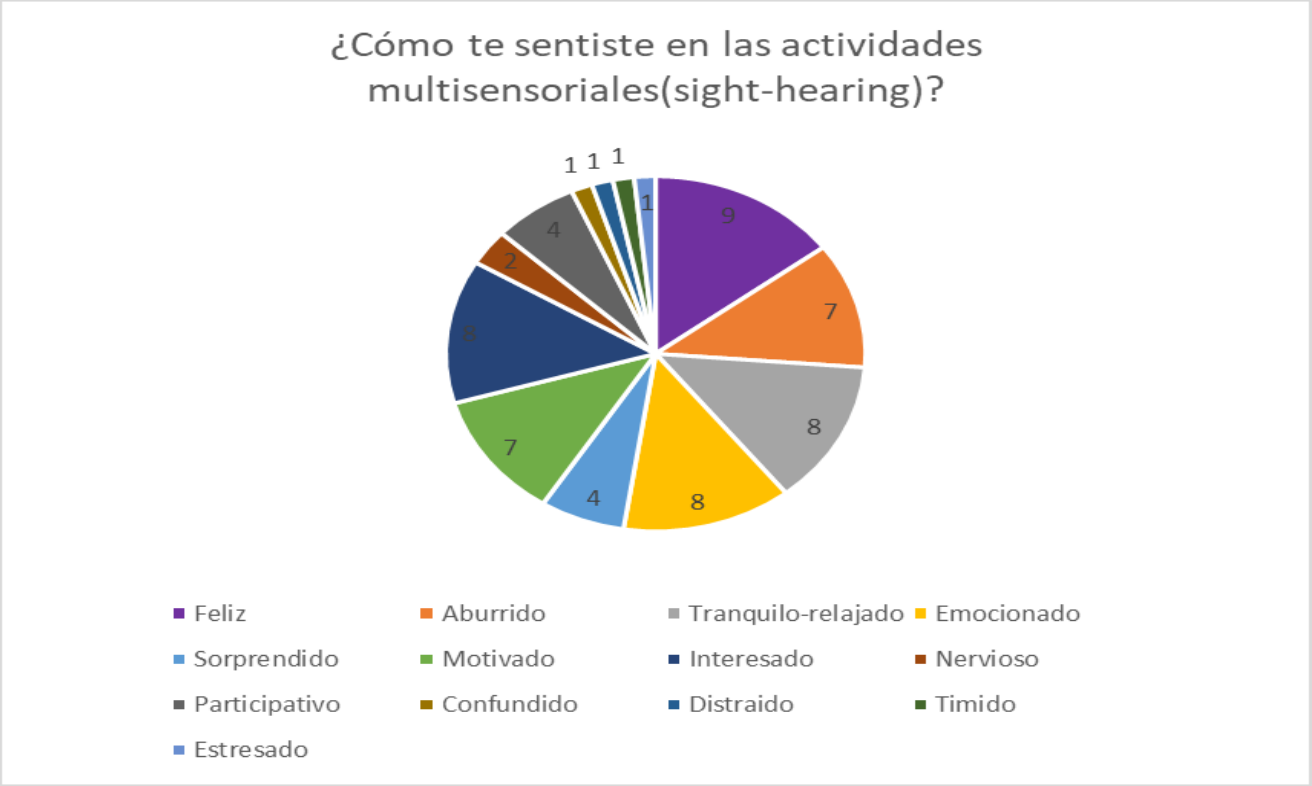
Open question. Sight-hearing results.

Note: Own elaboration.

These results confirmed once again in the last item, where there was a wide variety of options selected to describe their emotions. The most frequent were happy (9), excited (8), interested (8), bored (7), and motivated (7), and less frequently marked participative, stressed, nervous, surprised, calm or relaxed. Although to a lesser extent compared to the other sessions, descriptive adjectives such as interesting, happy, motivated, relaxed, excited, and interested continued to predominate. In contrast, with regard to words associated with disengagement, an increase in the perception of boredom was observed. These results showed that, although some students in the sample benefited from learning through the audio-visual channels (9 students) many others did not perceive meaningful foreign language learning through these two modalities (10 students).

Figure 31

Open-ended question. Sight- hearing results.



Note: Own elaboration.

4.7.3. Proprioception-vestibular MAEQ findings.

A single questionnaire was administered across the four sessions targeting these two senses, as recent research has demonstrated that "the proprioceptive and vestibular systems work together synergistically to provide what is often referred to as our 'sixth sense' in daily activities" (Cullen and Omid, 2021, p. 31).

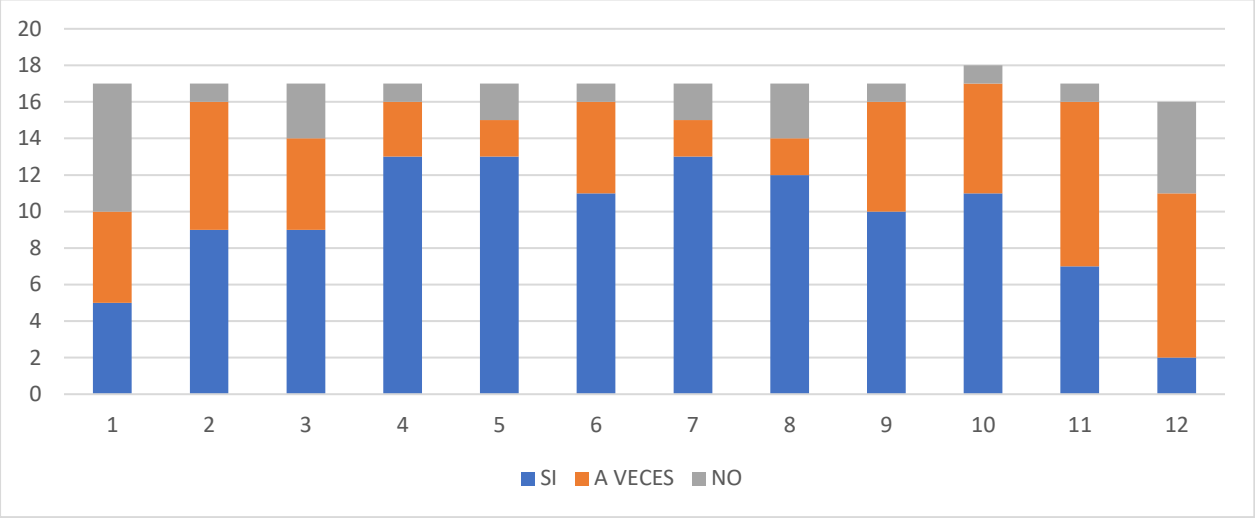
In the proprioception and vestibular questionnaire, Items 4, 5, 7, and 8 obtained the highest number of yes responses. These items were: “I am learning new things in the multisensory sessions,” “I think learning English through multisensory activities is interesting,” “I felt happy during the multisensory sessions,” and “I connected easily with the proposed activities.”

The statements with the highest number of no and sometimes responses were Items 1, 11, and 12: “I was a student who participated a lot in the sessions,” “I used English vocabulary about the senses during the sessions,” and “I constantly asked questions during the sessions.” This pattern may be explained by the nature of the activities, which primarily involved bodily exercises and playful dynamics. Consequently, students perceived that there was limited participation in English. As a result, they asked fewer questions and reported minimal use of English output, with seven students selecting no and five selecting sometimes.

The emotional dimension yielded the strongest results, with 49 yes, 11 sometimes, and 8 no responses, indicating students’ interest, connection, and enjoyment of the bodily activities. In contrast, the behavioral dimension showed fewer yes responses and greater uncertainty, reflected in 30 sometimes answers.

Figure 32

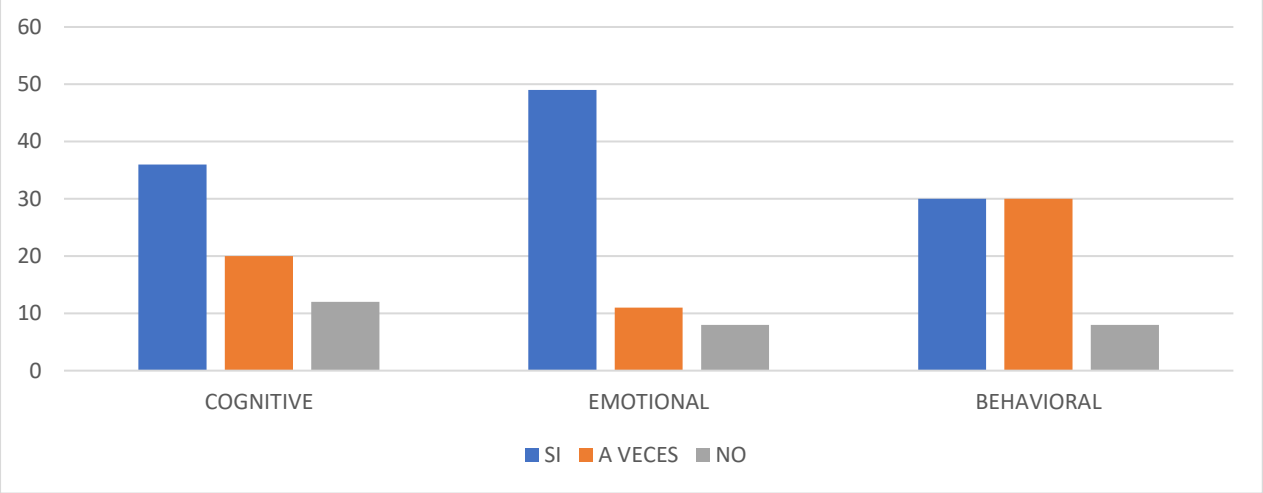
MAEQ proprioception-vestibular sessions results for each question



Note: Own elaboration.

Figure 33

MAEQ proprioception-vestibular sessions results for each dimension



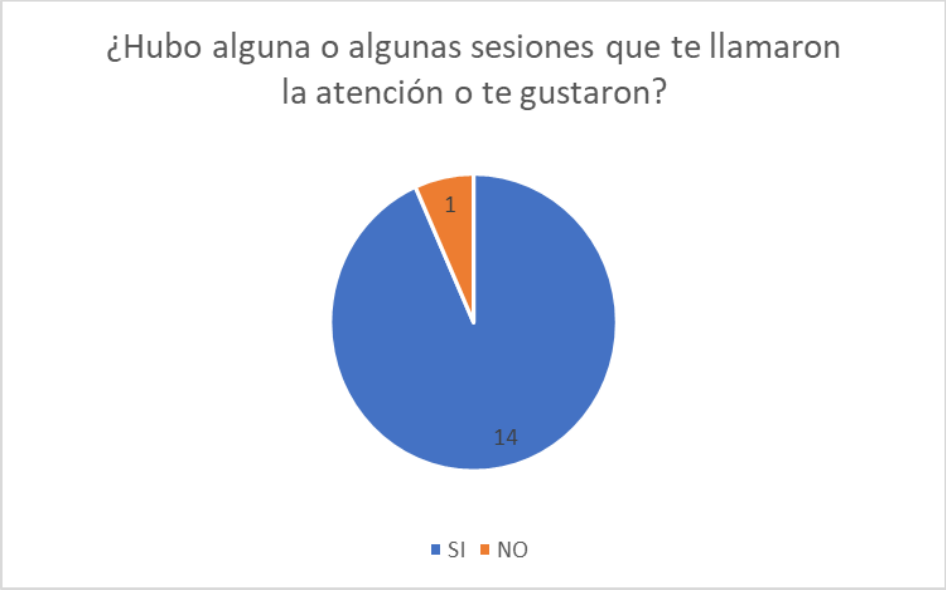
Note: Own elaboration.

Proprioception Open-ended questions

Regarding the open-ended questions, in the item 'Was there any session that caught your attention or that you liked?', 14 students selected "yes", only one chose "no" and two students did not select any response. Only seven students provided reasons: three said it was relaxing, three said it was fun, and one said it was interesting.

Figure 34

Open-ended question. Proprioception- vestibular results.



Note: Own elaboration.

Figure 35

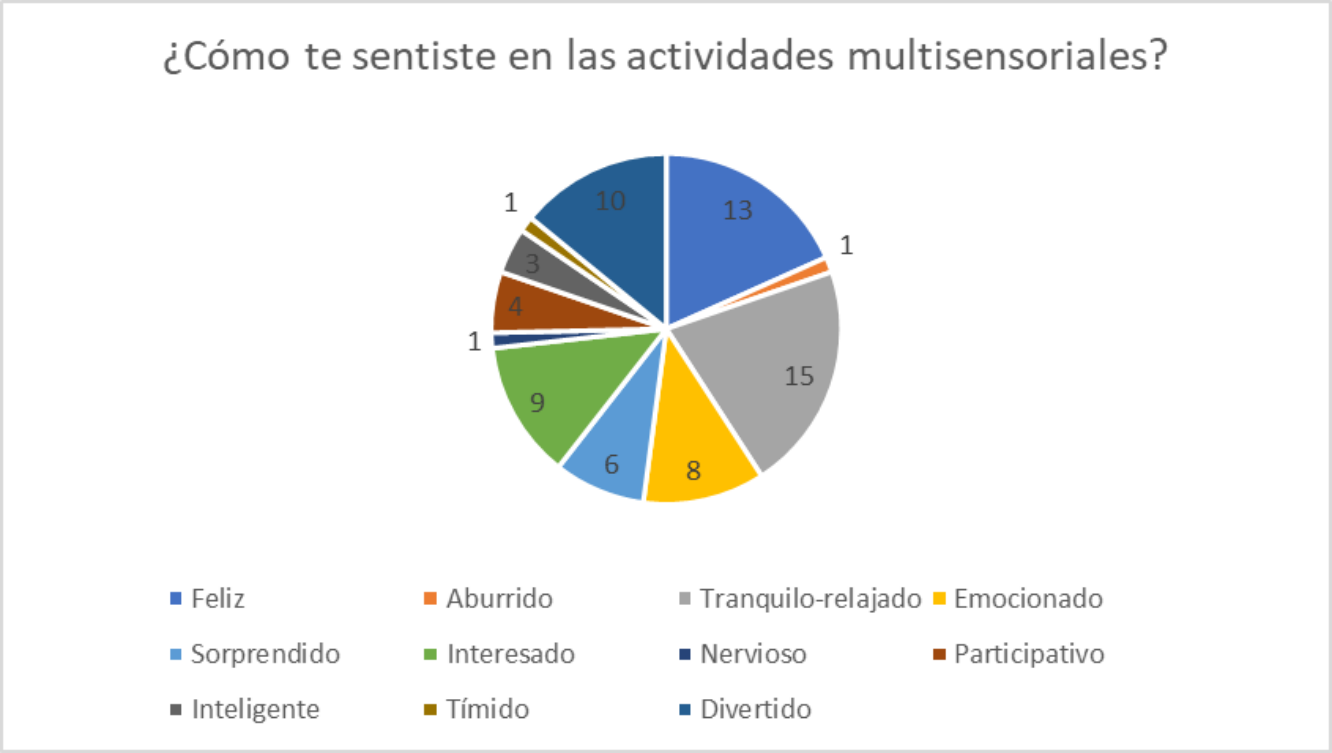
Open-ended Question. Proprioception- Vestibular results.

Note: Own elaboration.

A wide range of emotions was reported in response to the question, "How did you feel during the multisensory activities?" The most frequent responses were fun, happy, calm/relaxed, interested, and excited. Although students continued to perceive that they did not use English extensively during these sessions, unlike in the sight-hearing sessions, their sense of being able to express ideas and engage bodily increased. This finding supports the importance of consistently strengthening foreign-language input through bodily engagement, without prematurely demanding oral output. As Krashen has argued "there is only one way for humans to acquire language: by understanding messages, that is, by receiving comprehensible input" (as cited in Liu, 2022, p. 474).

Figure 34

Open-ended question. Proprioception-vestibular results.



Note: Own elaboration.

4.7.4. Taste-smell MAEQ findings.

In the first part of the questionnaire, in the multiple-choice section, it was clear that the items with the highest number of 'yes' responses were item 7 "I felt happy during the multisensory sessions", item 4 "I am learning new things in the multisensory sessions", and item 3 "I was able to express myself easily with my ideas and my body". This clearly showed students' perception of strong emotional and cognitive engagement, since they stated that they learned new things during the taste-smell sessions. Additionally, they affirmed that they were able to express their ideas and use their bodies for learning.

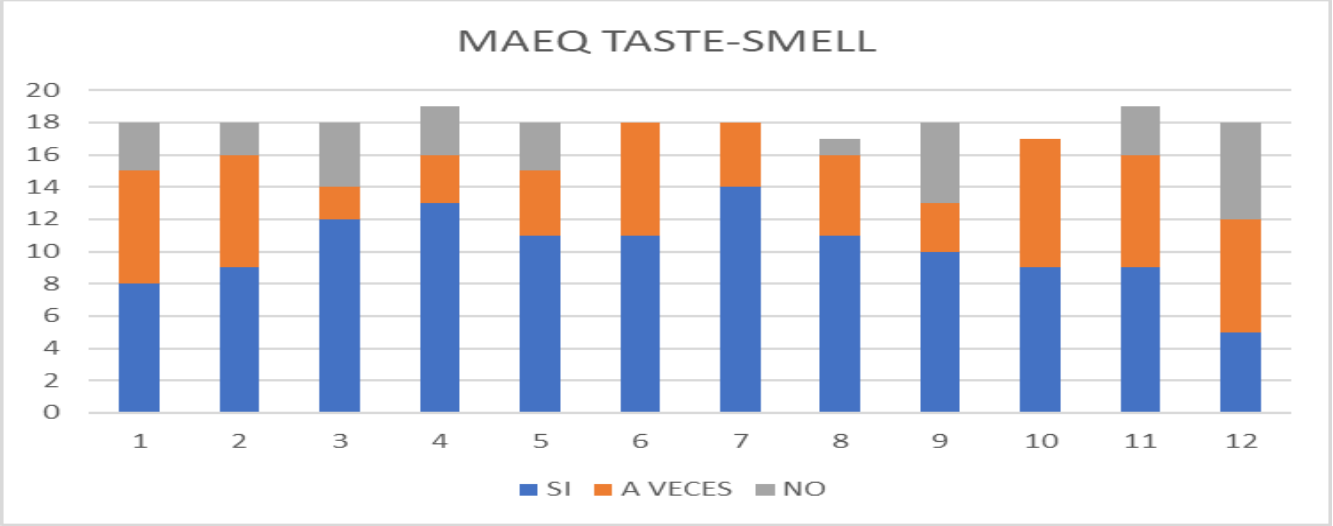
More than half of the students (11) selected "yes", four selected "sometimes", and none selected "no" in the item 5 "I think learning English through multisensory activities is interesting". The same pattern appeared in item 6 "I enjoyed the multisensory sessions with my active participation"), 11 marked "yes", 4 marked "sometimes", and no one selected "no" clearly showing their positive perception of high group participation in the proposed activities. Likewise, in item 10 "I paid attention to the instructions given in the activities", all students selected either "yes" or "sometimes" and no one chose "no". Students' responses showed that they paid active attention during the tasks. In these sessions, students' perception of using the English language began to shift. Unlike in the proprioception and interoception sessions, only three students stated that they did not use the foreign language, compared to eight who said "yes" and seven who said "sometimes".

The statement with the most varied responses was item 12 ("I constantly asked questions during the sessions"), with 5 "yes", 7 "sometimes", and 6 "no". The Item 9 "I worked hard during the multisensory sessions" also showed variation with 10 "yes", 3 "sometimes", and 5 "no". Here, it would be necessary to further explore what "working hard in class" means to them, since these sessions did not involve textbook work but instead the use of the proposed artifact with minimal writing.

The two dimensions that were most activated were the cognitive and emotional ones, reflecting students' perception of learning the language through taste and smell, as well as their feelings of happiness in the emotional dimension.

Figure 35

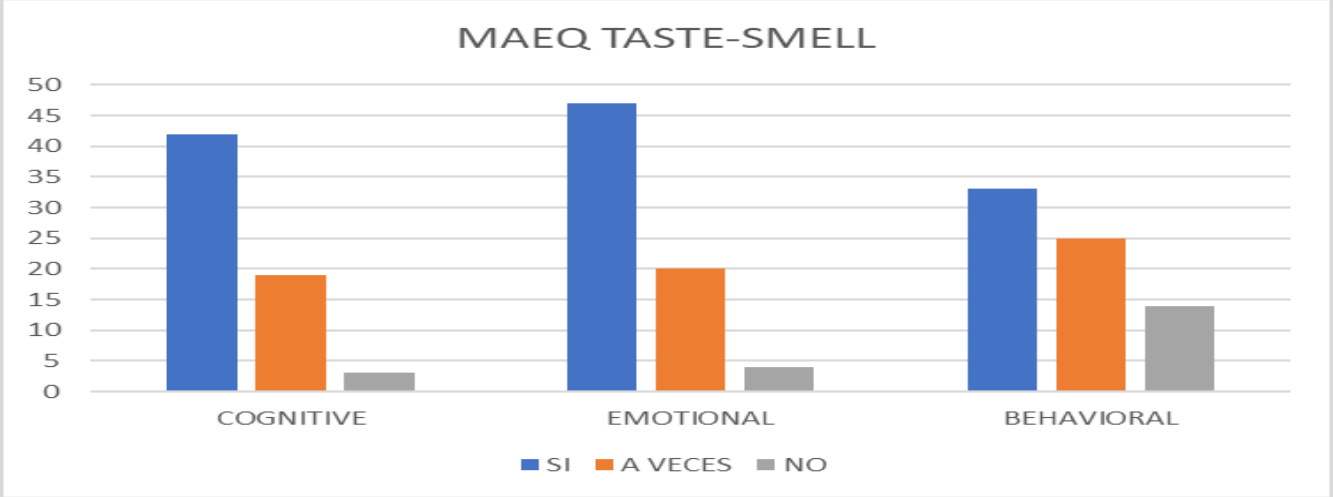
MAEQ Taste-smell sessions results for each question.



Note: Own elaboration.

Figure 36

MAEQ Taste-Smell sessions results for each dimension.



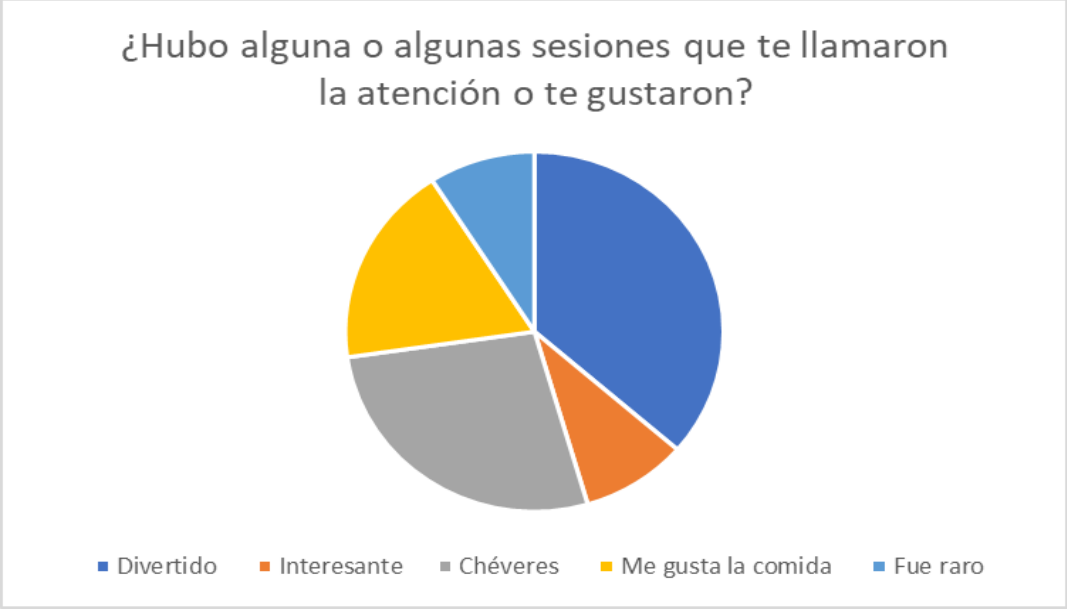
Note: Own elaboration.

Taste- Smell Open-Ended Questions

Regarding the question "Was there any session that caught your attention or that you liked?". Only one student selected "no", while 18 selected "yes". Among the reasons provided were fun (4), cool (3), I like food (2), interesting (1), and one student described it as "weird".

Figure 37

Open-ended question. Tate-smell results.



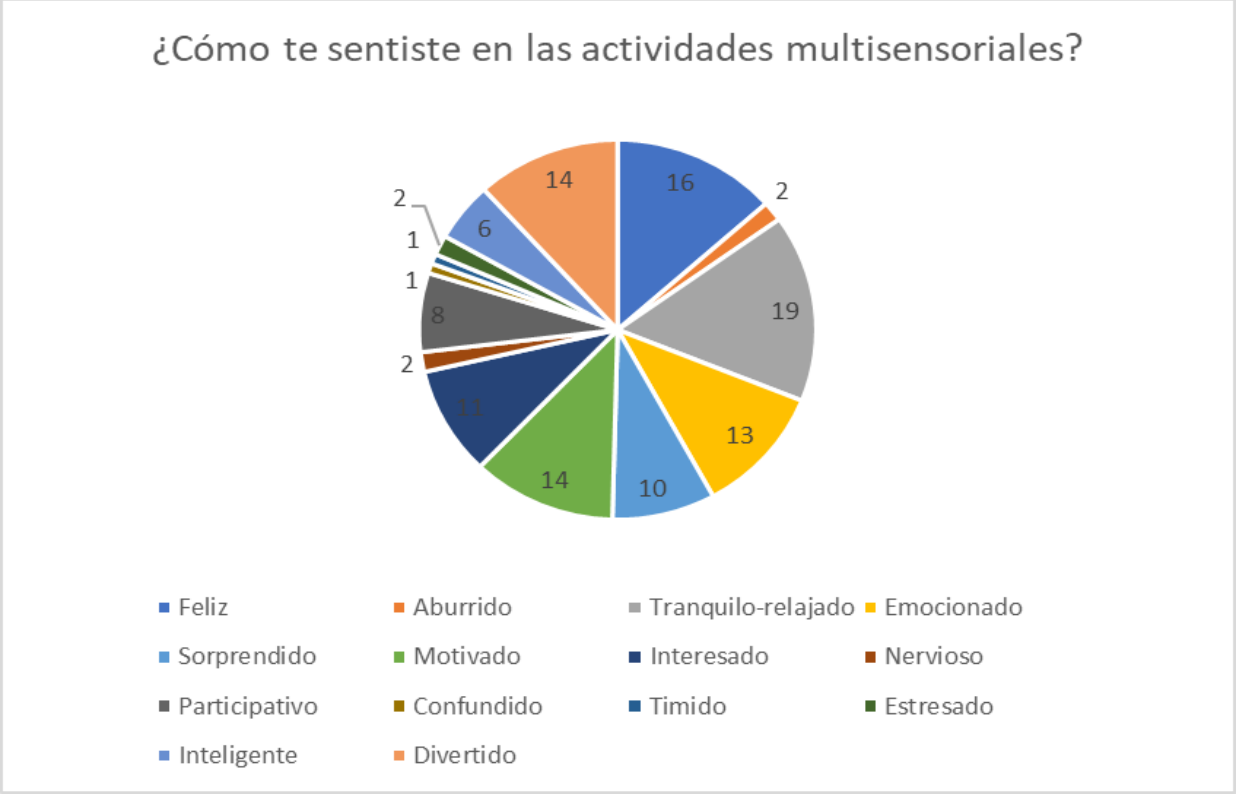
Note: Own elaboration.

In the last item, "How did you feel during the multisensory activities?", the answers were very diverse, with the most frequent being happy (16), calm–relaxed (19), motivated (14), fun (14), excited (13), surprised (10), and interested (11). Items that indicated emotional disengagement, such as bored, stressed, shy, nervous, or confused were selected only once or twice. In both the statements and the final item, students consistently reported feeling happy during these sessions.

The strong activation of feelings of relaxation and calmness, along with the low frequency of emotions associated with disengagement, reflected their low levels of emotional anxiety, creating a favorable environment for receiving input. As Krashen (cited by Liu, 2022) affirmed that "learners can better receive input only when their emotional anxiety is low and the emotional barrier is weak" (p. 475).

Figure 38

Open-ended question. Tate-smell results.



Note: Own elaboration.

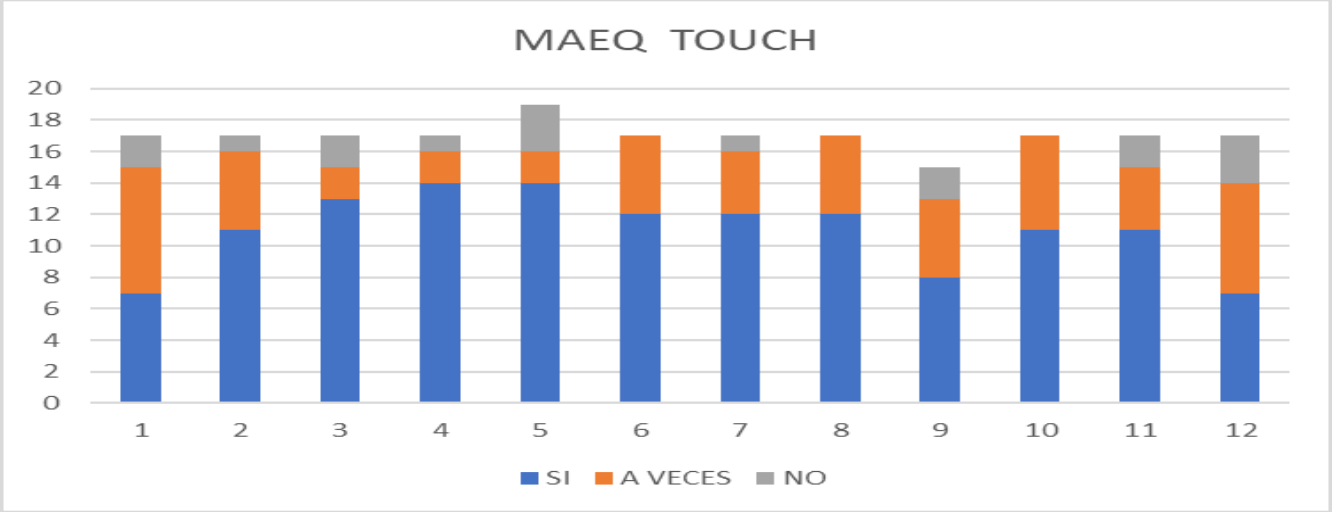
4.7.5. Touch MAEQ findings.

In the first part of the questionnaire, in the multiple-choice section, it was clear that the items with the highest number of 'yes' responses were item 5 "I think learning English through multisensory activities is interesting", item 4 "I am learning new things in the multisensory sessions", and item 3 "I was able to express myself easily with my ideas and my body". However, the items that showed the most consistent responses, with 'no' answers, were item 6 "I enjoyed the multisensory sessions with my active participation", item 8 "I connected easily with the proposed activities", and item 10 "I paid attention to the instructions given in the activities". This resulted in the cognitive and emotional dimensions showing greater activation in the "yes" and "sometimes" options in comparison with other sessions such as vestibular and proprioception.

In contrast, the behavioral dimension showed greater variety in responses. For item 9 "I worked hard during the multisensory sessions", 8 students selected "yes", 5 "sometimes" and 2 "no". For item 12 "I constantly asked questions during the sessions", 7 selected "yes", 7 "sometimes" and 3 "no". This was the lowest number of "no" responses for this item, along with the "all the senses" session, indicating that more students felt that they participated actively in these sessions.

Figure 39

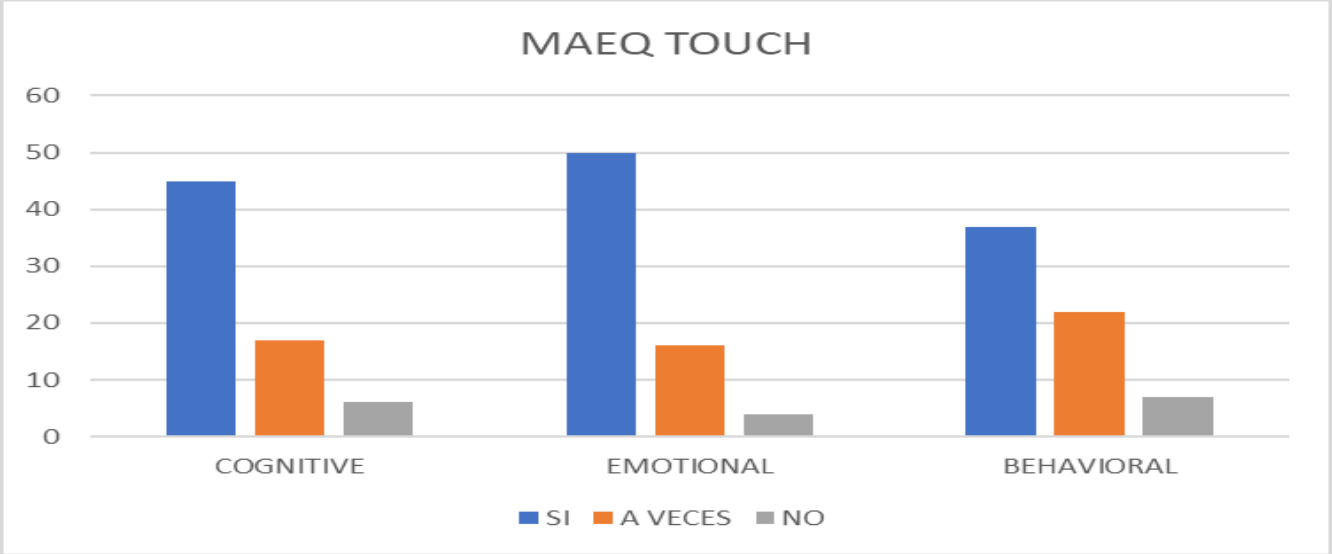
MAEQ Touch sessions results for each question



Note: Own elaboration.

Figure 40

MAEQ Touch sessions results for each dimension.



Note: Own elaboration.

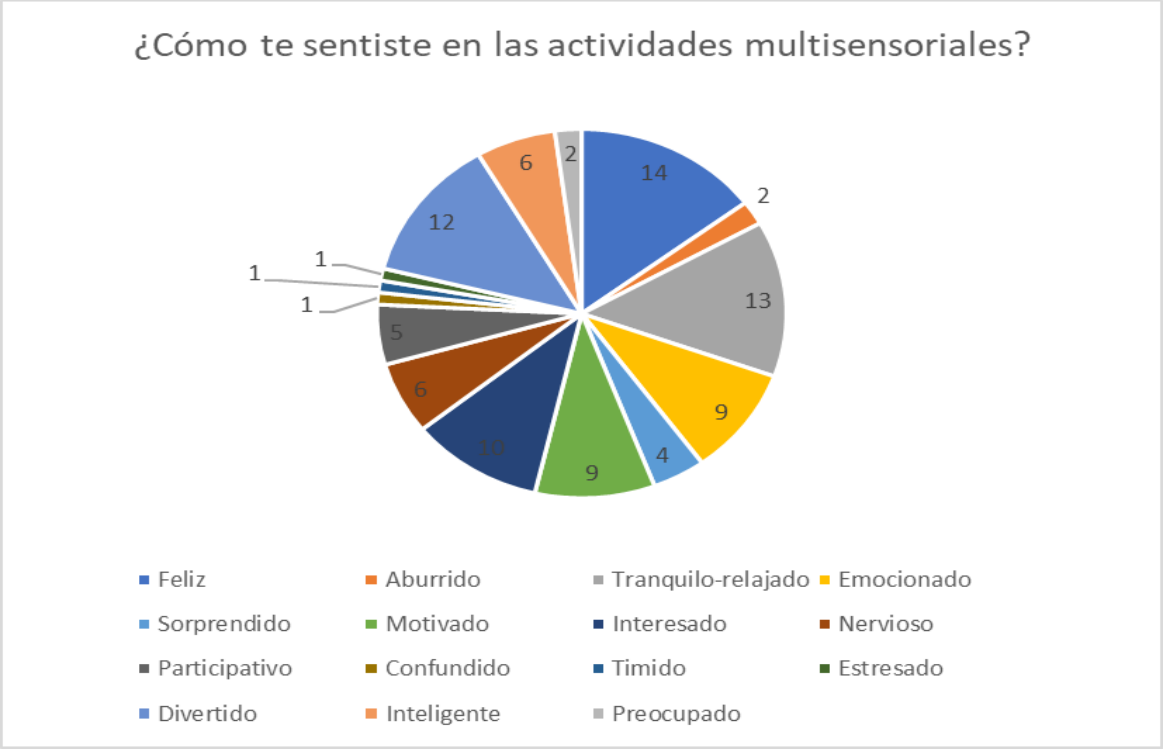
Touch Open-Ended Questions

Regarding the question 'Was there any session that caught your attention or that you liked?', 12 students answered 'yes,' but the others did not respond to this item, and those who selected 'yes' did not provide their reasons. In the last question, 'How did you feel during the multisensory activities?', there was a wide range of emotions, with the most frequently selected being happy (14), calm–relaxed (13), fun (12), interested (10), motivated (9), and excited (9). The items associated with disengagement (bored, confused, shy, stressed, and worried) were the least selected, with only one or two responses each. These results indicated a strong emotional acceptance and a positive reception of the tactile-focused sessions. Furthermore, as the aim of these sessions was to increase learners' exposure to the target language, they emphasized recognizing and interpreting the world through touch and hearing, guided by structured instructions.

The approach was aligned with Krashen's (1982) view that, rather than supplying learners with grammar, the teacher's most basic but most valuable role is to be the simpler 'teacher talk', as long as the focus of the class is on providing input for acquisition." (p. 58).

Figure 41

Open-ended question. Tate-smell results.



Note: Own elaboration.

4.7.6. "All senses" session MAEQ findings.

Items 4 "I am learning new things in the multisensory sessions", 5 "I think learning English through multisensory activities is interesting", 6 "I enjoyed the multisensory sessions with my active participation", 7 "I felt happy during the multisensory sessions", and 10 "I paid attention to the instructions given in the activities" showed the highest number of "yes" responses, mainly activating emotional engagement.

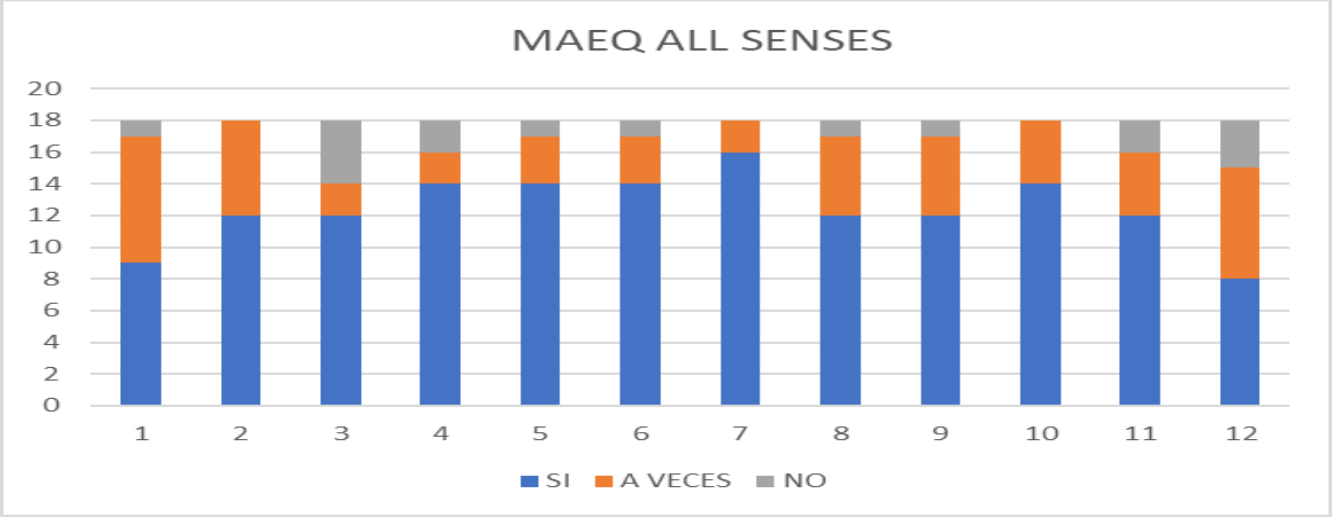
However, unlike in previous sessions, the cognitive and behavioral dimensions also showed an increase in their "yes" and "sometimes" responses. The data suggested a more uniform distribution of engagement in this session across all the dimensions since the low frequency of negative responses observed in other sessions.

The items with the most divided responses were item 3 "I was able to express myself easily with my ideas and my body" with 12 "yes", 2 "sometimes" and 4 "no". The item 12 "I constantly asked questions during the sessions", with 8 "yes" 7 "sometimes" and 3 "no".

This was the session in which the highest number of students indicated that they had used the foreign language with 17 students. Only one student stated that English was not used during the session. This was reflected in item 1 "I used the English vocabulary about the senses in the sessions", in the transcriptions with eleven students using the target language and the personal diary. The three instruments indicated an increase in students' output during this session. This increase occurred in line with Krashen's personal view (1982), in which he suggested "simply not to force production and to let the student decide when to start talking." (p.74).

Figure 42

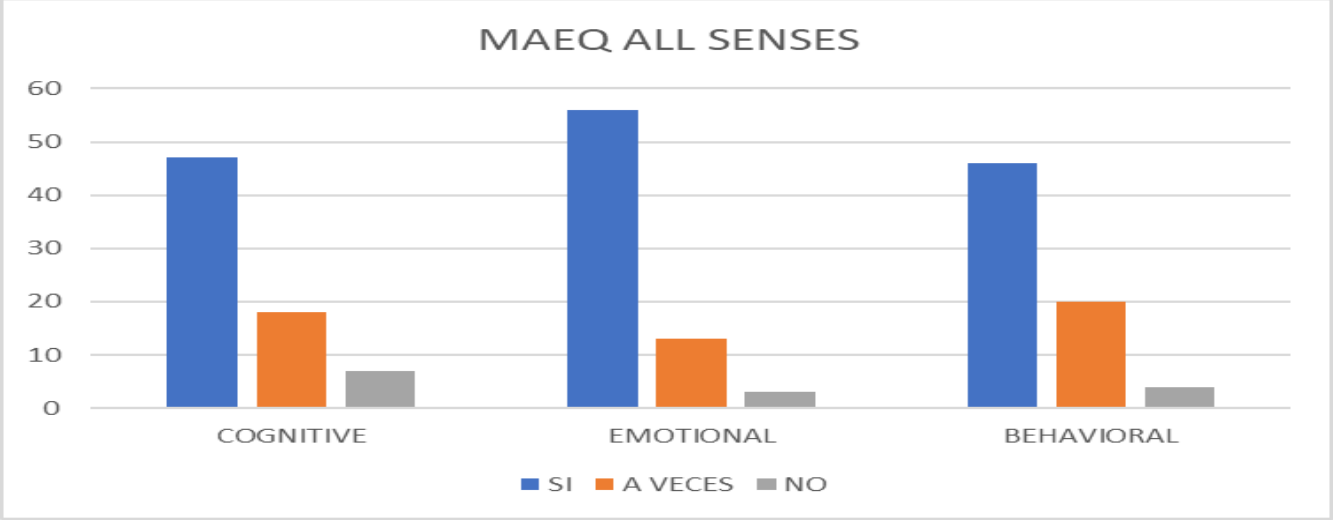
MAEQ "all senses" session results for each question.



Note: Own elaboration.

Figure 43

MAEQ "all the senses" session results for each question.



Note: Own elaboration.

"All senses session" Open- Ended Questions

Regarding the question "Was there any session that caught your attention or that you liked?", 14 students answered "yes" and 5 answered "no". None of the students who selected "no" provided a reason for their response. Among those who selected "yes", six wrote reasons that included the words interesting, fun, and chévere (cool). Finally, in the item "How did you feel during the multisensory activities?" 21 students selected calm–relaxed, 16 happy, 14 excited, 12 interested, 10 motivated, and 10 surprised. Those emotions associated with disengagement, such as bored, confused, stressed, and nervous, were each selected only once.

These results showed that the activity generated balance across the three dimensions of engagement (behavioral, cognitive, and emotional), minimizing anxiety levels, as evidenced by the 21 selections of the options "calmness and relaxation" during the activity. Additionally, an increase in students' perception of their use of English was noted on their choices.

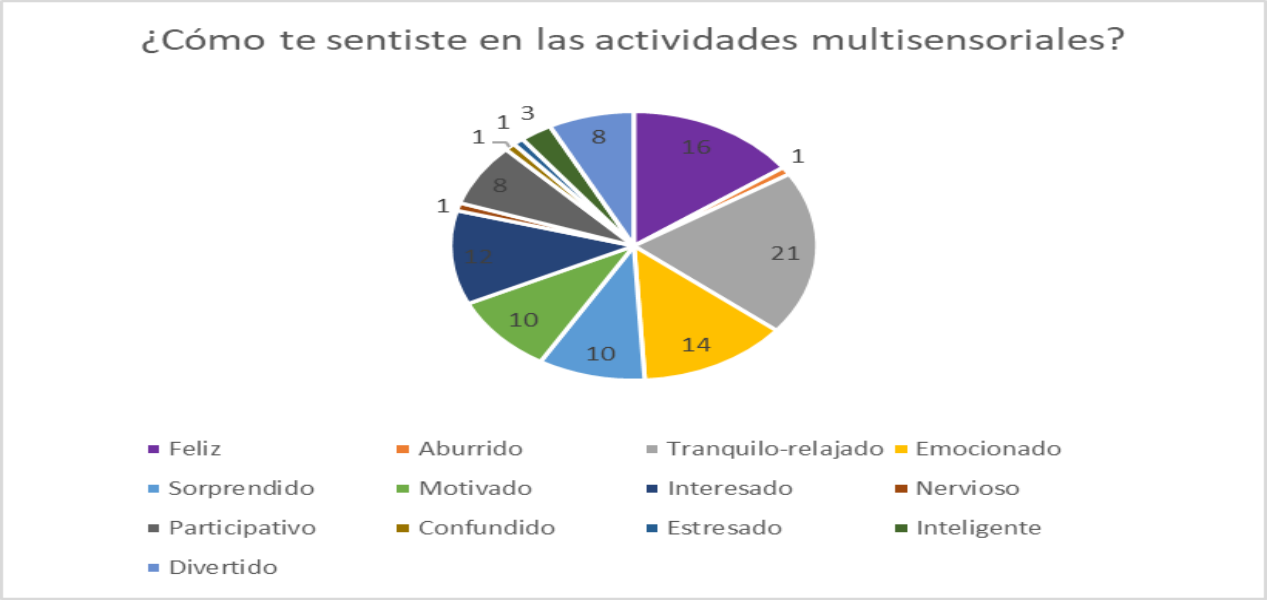
Figure 44

Open-ended question. "All senses" session results

Note: Own elaboration.

Figure 45

Open-ended question. "All senses" session results.



Note: Own elaboration.

4.7.7. General Results MAEQ (Multisensory Activities Engagement Questionnaire)

As shown in the figure 46, compiling all questionnaires, the statements with "yes" responses received the highest number of selections from students: item 4 (82) "I am learning new things in the multisensory sessions", item 5 (78) "I think that learning English through multisensory activities is interesting", item 7 (79) "I felt happy during the multisensory sessions", item 8 (72) "I connected easily with the proposed activities", item 10 (67) "I paid attention to the instructions given in the activities", item 3 (62) "I was able to express myself easily with my ideas and my body", and item 9 (59) "I worked hard in the multisensory sessions". These were the statements with the highest number of affirmative responses, where it is reaffirmed the students' engagement in the activities at the cognitive level since they felt they were learning new things and perceived learning English through multisensory activities

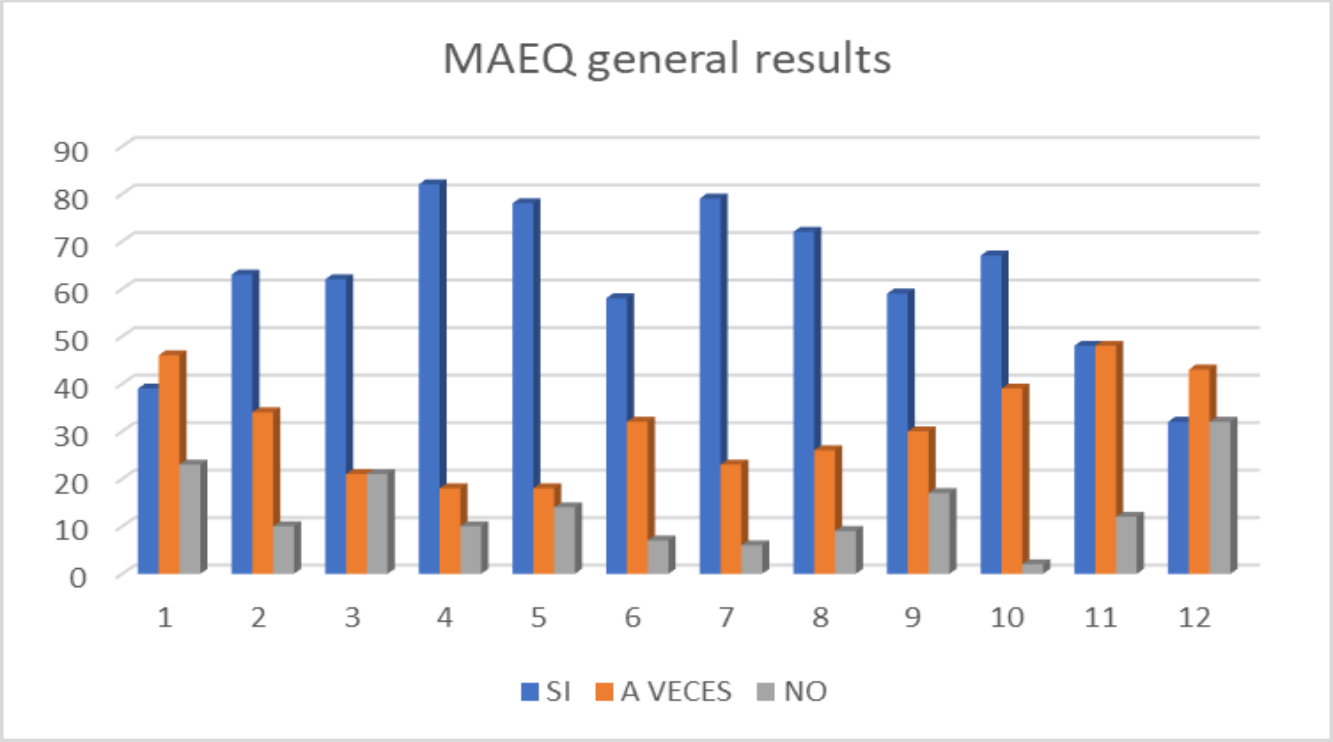
as interesting and a positive emotional environment because they reported feeling happy during the activities.

In this way, lower levels of anxiety were achieved, enabling them to connect with and participate easily in the proposed activities, paying attention to them, and expressing their ideas through their senses and their bodies; as Krashen suggested (1982), “If the topic being discussed is at all interesting, and if it is comprehensible, much of the "pressure" normally associated with a language class will be "off", anxiety will be lowered, and acquisition will result” (p.74).

Items 1, 11, and 12 received the fewest “yes” responses, and displayed the most varied results. In item 1, “I used the English vocabulary about the senses during the sessions,” 39 students reported having used the foreign language, 46 reported doing so sometimes, and 23 selected “no.” In item 11, “I was a student who participated actively in the sessions,” 48 answered “yes,” 48 “sometimes,” and 12 “no.” The final statement is the one that received the highest number of “no” responses across the questionnaires (32), corresponding to the statement “I asked questions constantly during the sessions,” for which 32 students selected “yes” and 43 selected “sometimes.”

Figure 46

MAEQ General Results for each question.



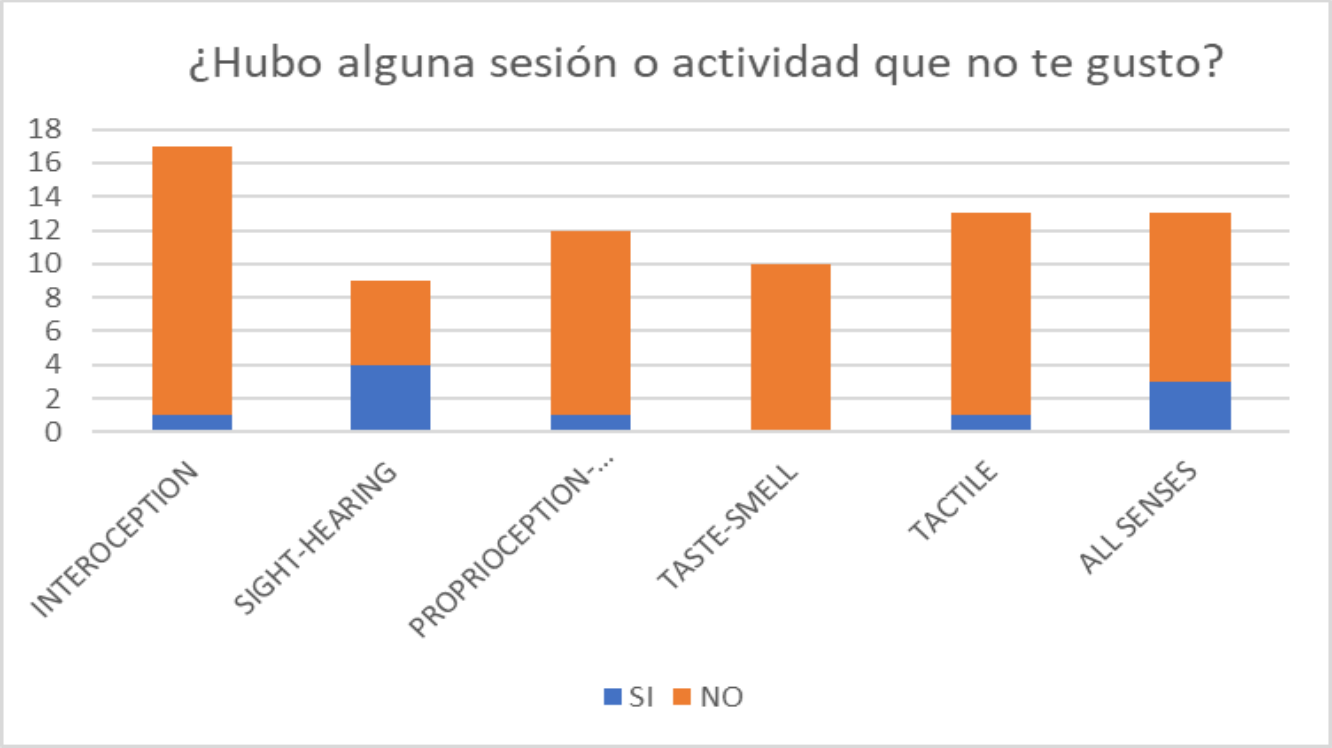
Note: Own elaboration.

The item that received the fewest responses from students, and the one with the most imprecise explanations, was the question "Was there any session or activity that you did not like?" Although not all students completed this question, the sessions that appeared to be least liked based on their responses were "sight-hearing" and "all senses" session. It seems that, in answering this question, students did not focus specifically on the sessions listed in the questionnaire, as they mentioned activities from other sessions and sensory modalities. Among the activities and reasons, they provided for not liking them were: "The activities where we had to write," "the alien activity," "almost all of them," "the flamenco game," "soccer crab," "I

didn't like any," "the one where we used the textbook," "I felt like it was a normal class, just with less light," and "the part where we had to write in the book".

Figure 47

MAEQ General results for open-ended question.



Note: Own elaboration.

In the question measuring engagement with the activities "Which activities did you like?". The most frequently mentioned responses were: food-related activities with the taste-smell sessions (17 students), "I liked all of them" (16), the spa session (8), soccer crab (9), squishy alien (7), and the session in which students measured their active and resting heart rate (7).

The least frequently mentioned activities were those involving sounds (1), videos (2), exfoliation (4), balance (vestibular) (3), and tactile activities (4). In these responses, it again becomes evident that the sessions students enjoyed the most were those involving the experimentation of non-predominant senses, with taste-smell, touch, interoception, tactile activities and proprioception being the most well-received. It can therefore be asserted that through these sensory channels and activities, those most strongly favored by the learners, it could be possible to "provide a larger amount of comprehensible and interesting/relevant input with a low filter" (Krashen, S, 1982, p.132).

Figure 48

MAEQ General results for open-ended question.

Note: Own elaboration.

To strengthen agentic engagement, which valued students' suggestions and perspectives regarding the proposed sessions, the question "Would you change or add anything to the

multisensory sessions?" was included. Thirteen times they responded that they would change something, while 78 times they stated that they would not change anything. They were then asked to answer the question "What would you change or add to the multisensory sessions?" Among the responses were: "I would change everything," "Doing something that is not like a normal class", "They were fun", "I would add playing more with the senses", "The behavior of some students", "That they only have the topic soccer", "Some fun games", "Bring more food", "Include more activities", "Do activities that are not about soccer", "Some seemed boring to me" and "I would like them to be in Spanish." It was evident that some responses are connected to students' personal preferences, such as their liking or disliking of soccer, their preferences for English or the activities proposed. Other responses are more oriented toward suggesting additional games or commenting on the behavioral aspects of their classmates.

Figure 49

MAEQ General results for open-ended question.

Note: Own elaboration.

4.8. Diaries Findings

This section presents the personal diaries in which the teacher-researcher recorded the activities implemented in each session, together with reflective observations and contextual insights that were not accessible through the transcriptions, video recordings, or questionnaires because of their inherent limitations.

4.8.1. Interoception

Diary Nº 1	**Observation date: session 1 may 13th-16th**
Grade: 4B	**Subject: English**
Place: Classroom	**Sense: Interoception**
Observer name: Adriana Contreras	
Description of the activity	**Notes, reflections and interpretations:**
Vocabulary key: Sleepy, Bored, Cheerful (happy), Surprised Scared, Motivated, Excited, Nervous, Calm Relaxed, worried, Confident, Embarrassed Disgusted, Amused, Confused, Hungry. I feel….. when …….. When I feel….my heart beats faster/slower My heart stands on end and give me the shivers when… 1. Feelings spa: Students will lie down on the floor and put on a damp wipe on their faces. Then, the instructions will be given. They will be asked to close their eyes, relax their feet and arms. 2. Mindfulness exercises: A relaxation session will be held, where they will be asked to silence their outer world and feel more their inner world, that is, to feel their organs, (breathing, stomach,	Students completed the questionnaire about their present sensations diligently, showing collective reactions and maintaining attention throughout the process. They were concerned about understanding unfamiliar vocabulary in order to answer the questions correctly. Some students began to report increased perceptions of pain in certain areas of the body. During the relaxation exercises, students demonstrated a lack of commitment to the activity, becoming distracted by external factors. It seemed that activities involving games or competition attracted their attention more than those that required following direct instructions regarding movements or tasks. They particularly enjoyed the part where they removed their shoes; however, some students felt embarrassed, and in the case of the girls, many happened to be wearing skirts that day, which prevented them from fully participating in the exercises. Because some of the proposed activities differed from what they were accustomed to, this generated, in the case of the skin-care activity, a moment of significant distraction, with many murmurs among students about the activity, which initially were prevented from achieving the intended objectives (calmness, relaxation, connection with their own body).

heart, extremities, senses, body temperature, mind, etc). 3.Focus on their hands and skin: Put hand moisturizer with wood, cedar and lavender essence while the teacher gives direct instructions to focus on their skin and hands by doing some exercises. Source: Koch, S. C., & Fuchs, T. (2011). *Embodied cognition and interoceptive awareness in therapeutic practices.* Journal of Consciousness Studies, 18(7–8), 179–197. **Session #2** 1. To share with the student's unusual vocabulary (itching, pain, hair stand up, sweating, dry, in a while, etc) 2. Instructions : implementation of interoception questionnaire : * Lay down your body on the floor and listen to it. What do you feel? *How do you feel when you are nervous? (my heart beats fast, I sweat, I eat my nails, I have problems with my voice, I move my body, I freeze. Is your mouth dry? Yes: Probably you're thirsty *Notice your heart beating, focus on your breath and your stomach. What are you feeling right now? Hungry, ITCHING, pain, it moves, etc. 3. Increasing heart rate and temperature: *Race: to run for 2 minutes and count the heartbeats before and after the race. What do you feel now? (my temperature rises or falls). 4. Implementation of the Engagement questionnaire.	For some students, maintaining concentration was difficult. I think that engaging in these types of activities more frequently may help improve their focus over time. These sessions require several elements that support an environment conducive to connecting with one's own body, such as relaxing music. In this particular session, this element could not be incorporated due to an internet outage. There were external circumstances that could disrupt the planned sessions (such as a prior physical education class leading to physical fatigue, or, in the case of girls, wearing a skirt that limited their participation in certain activities). **Session#2** They were in physical education class so their heart rate was faster, that's why I decided to start with the fast heart measurement activity. At first, some students did not want to do the active activity, because they said they were tired (Nicolás Martínez, Juan Diego ...) however, when they realized that the goal was to count their heartbeats and to increase their heart beats, they got motivated and did the activity, even with more exaggerated movements such as running around the room or doing push-ups. Most found it difficult to feel their heartbeats when it was slower, so it was necessary to help them and count their heart rate individually, making the process slower. The fact of helping them generated a physical approach with the students, making them feel important in the activity. Some manifested pain in the activity (head, throat, breathing etc). Perhaps, the fact of mentioning the topic made them inclined to feel these pains or it was coincidence. It is a group that likes to socialize every activity. Each body may be feeling different ways.
Additional features to be considered:	Unfortunately, three students were absent from these two sessions due to temporary disability, an issue that makes the comparison of their engagement with the other sessions harder.

Note: Own elaboration

According to this personal diary, students showed episodes of disengagement due to external factors and more directed activities, activated the DISENGEXT code, while they demonstrated higher levels of engagement in tasks that involved playing games. This instrument revealed certain difficulties prior to the activity that were not evident in the other two instruments (video recordings and questionnaires), and that could have affected the development of the sessions. The diary also showed a high degree of social interaction during the activities, students shared their heartbeat data, helped one another, and performed the same exercises, indicating the activation of social engagement. This interaction occurred not only among peers but also in their contact with the teacher, triggering the SOCENG code. Likewise, it became evident that the proposed activities could be motivating for some students, which generated the EMOIDENT code, while for others they generated embarrassment or disengagement with the BEFOLLOW code. In this personal diary, a not announced need to articulate bodily experiences whether in their native or target language becomes evident. This bodily need to verbalize internal sensations aligns with the connection between emotion, embodiment, and everyday language described by Wu, S., Wahle, J. P., and Mohammad, S. M. (2025, p. 1).

4.8.2. Sight-Hearing

In the personal diary, the disengagement of some students became evident when attempting to integrate the auditory and visual senses with the textbook. This is why the EMOCDISENG code was generated. However, for others, it was easy to remain focused throughout the activity, triggering the EMOIDENT code, showing curiosity and a strong desire to learn more about the topic with the BEFOLLOW code. Their participation, both in L1 and L2 activating the

BEFOLLOWL2- BEFOLLOWL1 codes, was so frequent that it occasionally became overwhelming. For some students, this could be due to their interest in the topic and their ease with which they learn through these two channels, as Majid et Al. (2018) mentioned "humans ought to be better at communicating about sight and hearing than the other senses" (p.11369).

Diary Nº 2	**Observation date: May 19th-23rd**
Grade: 4B	**Subject: English**
Place: Classroom	**Sense: Hearing and sight**
Observer name: Adriana Contreras	
Description of the activity	**Notes, reflections interpretations**
*The inclusion of real videos (audio/video) about satellites, planets, satellite photos, spacecraft, UFOs, meteorites, comets, astronauts, etc. *Solve activities in the student's book (Adjectives- comparatives and superlatives that require sight). Students could provide their own opinions, feelings and contributions related to the topic. Listening activities from the books including real sounds and pictures.	Students were quite motivated with the idea of darkening the windows in order to watch the videos properly. Nevertheless, when they listened to the instruction of working in the book, their attitude wasn't positive. Comments such as "¿pero no íbamos a trabajar hoy los sentidos? ¿Por qué con el libro? Con el libro no trabajamos los sentidos. I decided to mention that usually in classes they learn through their sight and hearing, probably that's why they were used to use these senses unconsciously. These videos really called their attention, especially rocket launches. The issue was they didn't use much English to ask or to participate. Nevertheless, they really wanted to participate and it was evident that they understood the input in the foreign language since they answered what I asked them or they gave examples about what I was saying. The video about F1 cars called the attention of boys and girls in general. I took some vocabulary flashcards that helped them to use adjectives, comparatives and superlatives in English according to the videos. The high quality of the audio and video (4k) in those videos helped a lot to recognize the magnitude of these vehicles and to compare them properly.
Additional features to be considered:	Some students found it difficult to concentrate on the activity; these were the same students who typically become distracted during lessons that follow the standard planning and suggested curriculum. It was difficult for some students that learn through other channels to maintain their attention just with the audio/visual input.

Note: Own elaboration

4.8.3. Proprioception

Diary Nº 3	**Observation date: May 26th-30th**
Grade: 4B	**Subject: English**
Place: Classroom and Outdoor	**Sense: Proprioception**
Observer name: Adriana Contreras	

Description of the activity	**Notes, reflections and interpretations**
Outdoor session focused on the awareness of the body and its movements: -animal walks. -stomping dinosaur -frog jumps -crab walks -snake crawls -deep pressure games: sandwich -blanket burrito Outside activity: To play crab soccer.	**1st session** At the beginning, the students were excited when they knew that the sessions to be conducted during the week would focus on proprioception, associated with movement, muscles and joints, posture, and coordination. I initially thought that they might resist the activity, as they sometimes dislike certain tasks because they feel either too old or too young for them. However, their acceptance was so strong that, by the end, they were asking to repeat turns, encouraging their classmates, and even turning the activity into a competition, wanting to participate alongside other classmates or imagining the more agile students competing. It is interesting that when several students express that they do not want to participate, the others tend to be influenced by this disengaged behavior. Conversely, when a few students show enthusiasm, most of the group is also influenced toward engagement. This shift occurred within the same activity, meaning that changes in their behavior happened very quickly. I expected the exercises to be easy for everyone; however, activities such as crab walks or snake crawls were challenging for some students (N.O, A.B, J. R). **2nd session:** Due to rain, the session had to be carried out inside the classroom, which slightly affected the quality of the activity, as it had to be completed in smaller groups. This caused the exercise to take longer and prevented other activities from being completed. Nevertheless, the students responded very positively to the crab soccer activity, cheering for their classmates and assigning themselves roles within the game, such as referee, timer, or the person responsible for throwing the ball back into play when it went out of bounds. Some students showed disengagement, choosing to draw while half of the class played.
Additional features to be considered:	Perhaps if the activity had been conducted outdoors with the entire group, engagement would have improved for everyone and time would have been used more effectively. Class time passed very quickly.

Note: Own elaboration

During the first session documented in the personal diary, both engagement and social engagement were activated. Students' willingness with the EMOIDENT code or unwillingness to participate with the DISENGBEHAVIND code, influenced the overall activity, motivating others to join in and triggering the behavioral-emotional BEHAVCOGIND-BEFOLLOW codes. It was mentioned that some last-minute unforeseen circumstances prevented the activity from taking place outdoors; however, it was still possible to carry it out inside the classroom. In these sessions, which relied more heavily on corporeality, several external factors became evident, such as weather conditions, the school uniform, and institutional constraints. These are variables that teachers often find difficult to control and that could, in various ways, affect the achievement of the objectives initially planned. As Bryce et al. (2025) state, "multiple domains may work in combination with one another to help or hinder the level of classroom support needed for student success" (p. 2).

4.8.4. Vestibular

In this personal diary, the essential role of the social dimension for middle childhood became evident. Since many of the proposed activities were designed for individual work, it raised the reflection on the importance of incorporating gamification as a strategy to foster social interaction. Through gamified dynamics, students may become more motivated to collaborate, build together, and face challenges collectively. This aligns with Kapp's (2012) definition, which states that "Gamification is using game-based mechanics, aesthetics, and game thinking to engage people, motivate action, promote learning, and solve problems." (p. 10).

Diary Nº 4 **Observation date: May 26-30th** **Grade: 4B** **Subject: English** **Place: Outdoor Sense: vestibular** **Observer name: Adriana Contreras**	
Description of the activity	**Notes, reflections interpretations:**
VESTIBULAR ACTIVITIES -Picking up something heavy without losing their balance -Control a soccer ball -Jumping rope -To walk in a straight line so that the toes of their back foot touch the heel or the shin of their front foot at each step. -wheelbarrow race -push and pull a rope -jumping a rope -make the wall bigger (pull the wall)	Students were asked to balance a notebook on their heads and walk to the wall, then turn around and continue walking as if they were marching while keeping the notebook in place. Some students found the balance component challenging, while for others it was easier. They wanted to continue taking turns and even proposed increasing the difficulty (such as adding more books to their heads), but due to time constraints they were only able to try twice. Before going to the green area, they were very excited about the idea of playing crab soccer again. Outside, during the circle activity where they had to stand on one foot and throw the ball to a classmate, some students struggled to maintain balance on one foot. I noticed that, particularly for the boys, concentrating or following instructions in open spaces was more difficult, as they tended to disperse, run, or play among themselves. They likely associate outdoor spaces more with free play. In the group ball activity, all of them used English to throw the ball to their classmates as indicated. They loved the team competition activity with the tug-of-war rope game. The only drawback was that some students pulled so forcefully that they hurt their hands. In activities like this, it was evident that they needed both, vestibular sense to maintain balance during the competition and proprioceptive strength to pull the rope effectively. During this activity, the boys appeared more engaged, perhaps because it involved play and competition rather than individual exercises. The individual jump-rope activity, where students jumped one at a time, was somewhat complicated, as each turn took time and the rest of the group became distracted with other activities. Having groups of three or four students jump together would make the activity more efficient. Most students found it difficult to jump over the rope individually. In the group jump-rope activity, however, many found it easier, and the whole group became involved. They wanted to continue the competition, but time did not allow for it. Although many activities had been planned, due to time, logistics, and weather conditions, fewer than expected could be carried out. For example, on that day the girls were wearing skirts because it was their designated uniform day, which prevented them from doing the wheelbarrow race. I preferred to cancel this activity to avoid making them feel uncomfortable. They loved the wall-pushing activity and were surprised, repeatedly exclaiming, “Ms., this is impossible—we will never be able to move the building!” The student S.A went through different emotional states during the session: he withdrew at times, then rejoined; he avoided direct participation, but later asked to help with the game. It was observed that students associated being outside the classroom with break time or “free time,” which made it difficult for them

	to focus on the instructions. With more detailed planning, class time could be used more effectively to avoid idle periods or having a single activity run too long.
Additional features to be considered:	I perceived that Individual proprioception activities tend to distract them easily. Games that involve interaction and playing are more engaging than individual exercises.

Note: Own Elaboration

Evidence of emotional engagement was observed, which activated the EMOIDENT code, as well as an increase in students' persistence despite moments of failure with behavioral–cognitive indicators, using the BEHAVEMOIND- BEFOLLOW codes. It was mentioned that some of them made suggestions and adapted the game, suggesting the AGENTPRO code.

Toward the end of the session, however, signs of disengagement appeared in response to some of the external activities. These sessions prompted reflection on the selected activities based on students' reactions to them. It became evident that group-based tasks involving gamification facilitated better classroom management and helped prevent collective disengagement, activated with the BEHAVSOCDISENG code, particularly in outdoor environments where external distractors are more prominent. This, coded with DISENGEXT.

4.8.5. Taste-Smell

Diary Nº 5 **Grade: 4B** **Place: Classroom Sense: Taste and smell** **Observer name: Adriana Contreras**	**Observation date: June 3rd-6th** **Subject:**
Description of the activity	**Notes, reflections interpretations:**
Vocabulary Key: sweet, bitter, acid- sour, salty, delicious, fresh, juicy, spicy, nutritious, strong, tasteless, yummy, yucky, crunchy, bitter, creamy, ripe, unripe. Fruits: pepper, lemon (mandarino-tahití), mango Strawberry, blueberry, mangosteen, kiwi, coconut, soursop, passion fruit. Peach palm or chontaduro, guatila, lulo. https://wordwall.net/es/resource/17245778/taste https://wordwall.net/es/resource/72759838/taste Session #1 Activity in pairs: 1.Students will be Blindfolded. They are going to use taste and smell at the same time to guess different flavors and express his/her perception about each one. 2.The partner helps him/her to complete information he/she perceives about each flavor. (artifact) 3.Each student shares his/her answers. Session #2 Three ingredients pancakes recipe (1 cup flour,1 cup milk,1 Egg. OPTIONAL: sugar, syrup, flavor vanilla, banana, cinnamon, chocolate, caramel, coconut, fruits, etc. Step 1 Mix eggs, milk and vanilla together in a bowl. Put flour into a large bowl. Stir in sugar or their favorite topping. Make a well in the centre. Add milk mixture. Mix until just combined. Focus on textures, flavors and smell in each ingredient. Step 2 Heat a large non-stick frying pan over medium heat. Grease the pan with butter or spray with cooking oil. Using 1/4 cup mixture per pancake, cook 2 pancakes for 2	Session#1: The class started a bit late because recess was used for a soccer competition. The students arrived tired; some were sad and even crying. Getting them to focus was not easy, but with the help of the flashcards and the vocabulary review, it was possible to begin the session. When the groups were formed, they understood the explanation more easily than I expected. I emphasized the importance of being honest and using only the senses of taste and smell. Due to the limited time, each student was only able to complete three tests; however, they were eager to continue. It was a session that required them to trust their classmates and the items I gave them to taste. Even so, I feel they did very well, as their disposition toward the activity was very positive, and they followed each step of the instructions despite the emotions, surprises, and reactions that this type of activity naturally brings. I noticed that students found it challenging to use the vocabulary related to flavors in English to identify them accurately. Collaborative work proved helpful, as they supported one another by providing the foreign-language terms they were trying to recall. Unfortunately, the textbooks addressed the topic of tastes and smells (food) primarily through grammatical structures such as comparatives, superlatives, quantifiers, and containers rather than through the sensory use of these concepts. As a result, the vocabulary available for identifying odors and flavors was limited, focusing instead on appearance and quantity. Session #2: The students were very excited because they knew they were going to eat (several had been asking in previous classes if that was the session where we would be cooking). They were asked to bring a bowl for mixing. At the beginning, we reviewed the recipe they would prepare, and they were very enthusiastic. They were allowed to choose between milk or water, sugar or honey, and different flavorings, chocolate, caramel, vanilla, or coconut, emphasizing the smell and taste. As a result, each pancake was prepared according to their own preferences. They were visibly thrilled as they added each ingredient. It was a very active session since I had to move quickly with the ingredients and ask each student about their choices. Because they had to request the ingredients before receiving them, there was a noticeable increase in their use of English. Unfortunately, the class period was too short to finish on time. Luckily, I had a free hour right afterward, which I used to cook the pancakes and call the students from their next class (technology) to come eat them and add their toppings again, asking for them in English which they did naturally. Many students expressed comments such as “thank you for the class,” “the pancakes were delicious,” and “I wish we could do this again.” There was no evidence of disengagement or students attempting to do other activities. On the contrary, there was a high level of participation in the foreign language, and they

minutes or until bubbles appear on the surface. Turn and cook for a further 1-2 minutes or until cooked through. Transfer to a	expressed that they were pleased with the activities
Additional features to be considered:	These activities require substantial prior preparation, including planning a wide variety of flavors and scents to broaden the olfactory and gustatory channels. This resulted in greater time and cost demands than those typically associated with regular lessons. Likewise, the amount of time needed exceeded the standard 45–50 minutes class period, making it necessary to request additional time from another subject in order to complete the session.

Note: Own Elaboration

External factors such as weather conditions, institutional events, or situations that commonly occur at their age during break time, particularly those related to soccer, including conflicts, losses, or victories affected the sessions since students presented high levels of anxiety, frustration, anger or sadness. It was noted that students followed each step of the instructions which activated the BEFOLLOW code, despite the distractions caused by these external factors, using the DISENGEXT code.

The choice of having them in groups and collaborative work to identify flavors and scents was successful. Likewise, in the second session, the combination of group work followed by an individual component where each student perceived and selected their own scents and flavors was effective. This exploration activated the emotional engagement and a higher EFL use with the EMOIDENT- BEFOLLOWL2 codes. The field diary also revealed a semantic limitation in the curriculum and textbook regarding these two senses, as they approach the topic from perspectives unrelated to olfactory and gustatory perception. This aligns with what several authors have noted about the lack of linguistic richness for these specific sensory domains. Despite these limitations in language “touch, taste, and smell are crude and of little value” for the textbooks and curriculum suggested by the institution (Majid et al. 2018, p.11369), an increased

use of English was observed, as students independently expressed their olfactory and gustatory preferences. Regarding teaching reflections, it becomes clear that these activities require institutional support in terms of materials, logistics, and time in order to achieve a more meaningful impact and to reduce the workload placed on the teacher.

4.8.6. Touch

Diary Nº 6 **Grade: 4B** **Place: Classroom** **Observer name: Adriana Contreras**	**Observation date: June 9th-13th** **Subject: English** **Sense: touch**
Description of the activity	**Notes, reflections or interpretations:**
1.Teacher provides different textures (Prickly, smooth, rough, soft, hard, tough, sticky, heavy, light, bumpy, hairy or fluffy, wet) and shapes (rounded, square, triangular shape) in order to identify the vocabulary. Students must be blindfolded. 1.Identify different elements of surprise using only touch using the vocabulary (gelatine, plastic spider, feathers, CD, thorny plant, flower, shell, marshmallows, sandpaper, honey) To write on a piece of paper their perception (artifact). 2.To write their perceptions about the textures, completing the form. I feel displeasure when I touch_____ textures. I feel pleasure when I touch_____textures. I felt: (scared, anxious, amazed- astonished, bored, furious, confused, excited, shocked). 1. The teacher provides different	**Session # 1** In the first session, they had to cover their eyes and guess the item or vocabulary. If they said it in Spanish, their partner helped them say it in English. This time, the activity was done in groups of three, and the containers rotated among the teams. Working in small groups made better use of time, as everyone participated and paid attention to their partner's turn. Most groups completed the activity diligently. Some students (especially boys) became distracted or played with the materials. This showed that they are not used to use these external but common elements during the English classes. Perhaps, using them more frequently would improve and normalize external elements in English classes. I found out that It was difficult to observe all the groups and check if they were using the vocabulary properly, but I could listen to their partners making corrections and writing the English vocabulary in the artifact. **Session #2:** In the second session, several students were absent (five in total). Despite this, the session had to be carried out on that day due to the permissions previously requested from the institution. Even with fewer attendees, there was strong acceptance of the activity and a clear desire to participate again. The session also prompted questions about people with sensory disabilities such as individuals who are blind or deaf and how they communicate and learn. These exercises help raise awareness about the importance and

containers and asks (bowl, can, packet, bar, bottle, glass, slice (pineapple) carton, pot, piece, jar, cup). Students should guess the food partitive just using their hands.	development of all senses.
Additional features to be considered:	Thanks to middle childhood theory I realize that teachers should take to the classroom more real elements from their context or use what they already have to make concrete knowledge, having them experience with their senses instead of using just what the book offers. I found that this enriched the class and their contact with the language.

An increase in social interaction activated the SOCENG code and in the use of the established vocabulary related to containers was observed within each group. Although it was difficult for them to remember the vocabulary associated with each sensation, they supported one another, activating the codes BEFOLLOWL2 and BEFOLLOWL1. Similar to the taste-smell sessions, the external elements brought into the classroom felt unusual to them, causing temporary behavioral disengagement, suggesting the DISENGEXT and BEHAVSOCDISENG codes. The second session showed greater adherence to instructions, triggering the BEFOLLOW code. Methodological adaptations, based on the theoretical foundations identified for this population, were also evident. Methodological adaptations occurred when instructional activities were modified from visually based tasks (e.g., identifying objects in books) to tactile and multisensory tasks, such as recognizing containers solely through touch and interacting with varied textures. This shift was implemented in response to the pedagogical need to increase sensory input and support learners' embodied interaction with learning materials. These actions constitute methodological adaptations because they involve a deliberate change in teaching procedures and

materials to better align with learners' sensory processing and cognitive engagement. By replacing traditional visual-only strategies with hands-on, tactile exploration and continuous sensory stimulation, the methodology was adjusted to enhance perception, attention, and meaning-making processes, thereby reflecting a flexible and responsive instructional design.

4.8.7. All senses session

According to the personal diary description there was a higher participation of the whole group, activating BEHAVEMO and EMOIDENT codes. There was a calm environment during the activity. Students were discussing about aliens and their handcraft, but everyone was quite concentrated, suggesting the SOCENG code. That is why the codes BEFOLLOW and BEFOLLOWL1 were activated. They started to use the target language to ask for the materials. Time was not enough for these kinds of handcrafts, so it was necessary to use part of the following class. It was mentioned that pedagogically, it was quite difficult to include all the senses in just one session in a coherent way, but it could include several senses to enrich the learning through various channels. "The most important aspect is being able to generate in this population a 'constant stimulus', as suggested by Mah and Ford-Jones (2012, p. 81).

Diary Nº 8 **Grade: fourth B** **Place: Classroom** **Observer name: Adriana Contreras**	**Observation date: June 9th-13th** **Subject: English** **Sense: All senses**
Description of the activity	**Notes, reflections interpretations:**
With pleasant music they are going to create their own alien with its flying saucer. Students will have white Paper. They should fold it in a half and draw their own alien (they should think about its physical characteristics before starting the project, such as colors, arms, legs hair, head(s), etc.). Then, they cut it and paste both sides of the paper. They'll have glitter shakers, foamy, CD pieces, etc, to decorate it. Finally, they fill the hole with toilet paper or cotton and they can add their favorite scent and name it. The UFOS theme is perfect for sharing psychedelic food such as acid candies or sour dust. At the end, they could explain what it is called, what it eats, its home planet, taste, etc.	The students were happy and calm. The activity with lower anxiety levels, feeling the environment quiet and calm. This favorable environment helped them to share their artistic creation and the need to ask for the materials they wanted in English. Everyone did the activity and even those students who usually don't work constantly or it is necessary to push them, in this case they wanted to share their creation with the teacher. For example, students that love handcrafts and artistic activities. The levels of anxiety or pressure were lowered so much that they felt free to communicate and express themselves through art and orality. They forgot that they were in English class, so it was necessary to keep the input in the foreign language. Some started using the basic expressions or phrases suggested in class. Although the sense of taste was implemented with the test of something exotic, the sense of smell took on greater strength when incorporated into their creation. It is not easy to plan an activity that includes all the senses but it is possible to cover more than those usually used in English classes (sight, hearing).
Additional features to be considered:	As for taste and smell, I had problems with the time because 50 minutes were not enough for the activity proposed. It was necessary to use extra time during the next class to present their aliens.

4.9. Triangulation

This section presents an analysis from three complementary perspectives based on the descriptions and data obtained from all the instruments analyzed: video recordings, transcriptions, personal diaries, and the MAEQ questionnaire.

4.9.1. Interoception

In the three instruments, it was evident that although, as noted in the personal diary, some students found it difficult to achieve the objective of the spa activity, which was to be relaxed, others reported feeling relaxed. Social engagement was highly activated, as shown both in the personal diary and in the observation and transcription, making this one of the strongest indicators. This dimension was not included in the questionnaire, as it was better reflected in the other two instruments. Despite the fact that external elements contributed to some distraction, all three instruments showed a notable emotional identification with the activity, which in turn increased students' fulfillment to instructions and their reported feelings of happiness. Both the personal diary and the observations indicated temporary disengagement due to distractions with their classmates and due to the materials used in the two sessions, this meant disengagement by external reasons. In the questionnaires, the number of affirmative responses decreased while "sometimes" and "no" increased in the behavioral dimension, reinforcing what was found in the other instruments.

Although the activity was generally well received, both the diary and the observations indicated that, in the first session, wearing skirts impeded the girls from performing some of the relaxation movements, such as stretching their feet on the table or completing certain stretches. Although the group predominantly participated in their mother tongue and their comprehension of the input was evident through their completion of the physical activities and the artifact, only six students used English to express themselves spontaneously.

The questionnaire, observations, and personal diary, all indicated that the portions of the sessions that generated the highest engagement were specifically the spa activities and the heart-

measurement exercise, confirming that game-like activities were preferred over the more direct relaxation exercises. These needs observed in this age group, particularly their inclination toward teamwork and hands-on experimentation may be closely connected to the principles of gamification. According to Kapp (2012), "the goal of gamification is to inspire learners to participate and interact with other learners in an activity- or goal-oriented community," (p. 2) which could be aligned with the social and collaborative demands characteristic of middle childhood.

4.9.2. Sight-Hearing

The sessions that indicated the greatest diversity in student responses were the sight–hearing sessions, as some students reported feeling bored while others expressed excitement and interest. Contrary to their self-perception of being only minimally participative, these sessions showed the highest level of participation during the questions and required tasks, as documented through observations and the personal diary. As a result, behavioral engagement was highly activated, although this participation was more closely tied to the content of the session, and the inclusion of textbook-based activities, making it somewhat more oriented toward closed, guided responses. Group participation was clearly presented in both Spanish and English.

As these were more structured and group-oriented activities, students perceived themselves as participating less individually in the questionnaires. However, evidence shows that 10 students individually used the foreign language to participate or ask questions. Additionally, compared with the other senses, these sessions presented the lowest rate of emotional identification or emotional engagement, as indicated in the surveys, due to the use of the textbook during these sessions, which some students felt lacked innovation, since they are already accustomed to using

these two senses during regular classes. Emotional disengagement was also connected to students who use other senses or learn through other types of intelligences. Across the three instruments, disengagement was consistent in students such as E.C., J.R., D.S., N.M., I.R., and L.M.. Nonetheless, both the cognitive and behavioral-cognitive engagement dimensions were strongly activated in nine students, who made meaningful connections with their prior knowledge and other contexts. A noticeable increase in attention was observed when real audiovisual stimuli were introduced. Here it was evident the importance of Morgan suggestion (2021) about the use of plenty of pictures, images, photos, and drawing activities (P. 133).

4.9.3. Proprioception

In the three instruments, the questionnaire, classroom observations and the personal diary, there was clear evidence of heightened social and emotional engagement during these sessions. This increase in social-emotional activation led students to assert a lower perception of positive behavior and instruction-following in the questionnaire. These results align with the findings from the other two instruments, which also indicated a decrease in behavioral engagement.

There was limited output in the foreign language, as most student responses occurred in their L1, despite receiving the instructional input in English. Nevertheless, it seems that the physical activities stimulated the cognitive, cognitive–behavioral, and even agentic engagement dimensions, as students frequently proposed modifications and adjustments to the planned tasks. Among the activities, Soccer Crab generated the highest level of acceptance. This preference may be attributable to its competitiveness, and play preference, in contrast to the other tasks, which required students to follow specific instructions individually. In this session, it was

considered that most of the students in the group were boys and that they enjoyed playing soccer. (see activity description). The activity was therefore adapted into a group-based game, avoiding the use of their feet and instead requiring the use of arms and feet while lying on their backs, in order to provide equal opportunities for the girls participating. Using an activity related to the sport that most students liked generated a strong impact and high approval of the task, reaffirming the importance of considering students' interests and preferences. Al Liu, Z (2022) claimed "The enhancement of motivational aspects like self-efficacy and interest appears to have a high impact on learners' success and achievement." (p. 1).

4.9.4. Vestibular

In general, the three instruments indicated an increase in behavioral disengagement, particularly regarding instruction-following in outdoor settings. In both the proprioception and vestibular sessions, students showed a similar pattern: fewer "yes" responses and an increase in "sometimes" with 30 times in the behavioral dimension. This pattern is reinforced by the analysis of the transcriptions and video recordings, which reveal a high level of disengagement due to distractions and temporary disconnections associated with heightened social-affective activation during these activities.

Students who had demonstrated high engagement levels in previous sessions exhibited emotional disengagement during these two sessions (J.D., D.S., S.A.). The strength rope competition and balance exercises were the activities students enjoyed the most within this set of activities. The field diary revealed pedagogically relevant elements that were not easily identifiable in the other two instruments. These reflections highlighted how certain individual activities contributed to disengagement due to external elements and, as occurred in one of the

interoception sessions, the school skirt uniform impeded the girls from participating in the wheelbarrow race activity.

Unlike the proprioception session, the vestibular session generated a higher level of temporary disengagement among boys, whereas girls displayed an increase in emotional engagement. Another commonality was that these two senses focused on bodily movement. Probably this is why low amount of output was produced in the foreign language, despite the constant English input included in the planned activities. The low anxiety levels and the physical nature of these tasks may have led students to prefer using their L1 during peer discussions and spontaneous reactions. This should not be viewed as something negative, since, as Krashen (1982) claimed, teachers should not force early production in the second language but rather allow students to produce when they are ready (p. 7).

4.9.5. Taste-Smell

There was an evident emotional response in both the surveys and the observations. The majority of students (18) reported that they enjoyed the sessions, using expressions such as fun, interesting, and cool (chévere). These responses aligned with what was observed across the three instruments, where students displayed emotionally engaged feelings, represented in adjectives such as happy, excited, calm, motivated, interested, surprised, entertained, and willing to participate.

Regarding the behavioral dimension, the questionnaire results indicated that half of the students reported paying attention to the instructions, whereas the other half selected sometimes. A similar pattern was observed in the participation item, with half stating they participated actively while the remaining students selected “sometimes” or “no”. This behavioral

disengagement was also evident in the observations and the field diary. A noticeable contradiction emerged: although students appeared to follow the instructions, the sensory materials brought into the classroom elicited emotions, surprises, and reactions, generating temporary disengagement caused by external elements that were not typically present in English class. The social dimension contributed to enrich learning experiences, as students supported each other in identifying and interpreting the sensations involved in the target Language. However, social disengagement also occurred due to the use of the materials for joking or playing, particularly among male students.

The sessions also showed the highest level of spontaneous and individualized output in the foreign language across the entire set of lessons. A total of 13 students used English words or phrases related to food and personal preferences. This was revealed in the questionnaires, observations, and the personal diary, where the teacher noted surprise at students' spontaneous use of English when requesting toppings, assembling their pancakes, and expressing gratitude.

The taste-smell sessions were voted as the students' favorite activities. Aside from the importance of using these non-dominant senses such as touch and taste, the personal diary highlighted the use of real, tangible elements, in this case ingredients, food, and smells to achieve the objective of "making input comprehensible" and "taking advantage of the acquirer's knowledge of the world." (Krashen, 1982, p. 25).

4.9.6. Touch

Evidence demonstrated that students actively participated in the group activities and received consistent instruction. However, similarly to the taste–smell session, both the observations and the personal diary reflected moments of temporary disengagement due to distractions caused by

the materials brought to the session and by peer interactions.

There was less activation of individual output in the target Language with six students, although group participation in English increased noticeably. This aligned with students' perceptions reported in the questionnaires, where they indicated a greater use of the foreign language during the tactile sessions. The cognitive dimension displayed a positive trend, with more responses marked as "yes" and "sometimes," and far fewer marked as "no." The personal diary confirmed this perception, noting both individual effort and collaborative work when using vocabulary related to touch.

At the curricular level, the analysis revealed an absence of tactile-related activities in the textbooks which made it necessary to create an extra tool, the touch artifact to facilitate these sessions. Students benefited from group work when identifying textures: some named them in Spanish, and peers supported them by providing the corresponding word in English and by writing it on the instrument. Likewise, the use of extra material became necessary as the textbook did not include activities addressing this sensory modality. It was clear that touch helped students make meaning, regulate their emotions and understand abstract concepts, including language, since the body (including touch) functions as an active constructor of meaning in the learning process (Fugate, Macrine and Cipriano, 2018, p. 274).

4.9.7. All senses session

Considering the questionnaire results and the analysis of the observations, it is evident that the emotional dimension showed the highest level of engagement. However, the cognitive and behavioral dimensions also demonstrated high engagement levels. This indicated that this session was the one with the lowest perception of disengagement among students, which aligned with

the observational analysis, where no form of disengagement was activated.

The personal diary reflected a calm atmosphere and a high level of concentration throughout the proposed activity. This is reinforced by the students' questionnaire responses, in which most reported feeling calm, relaxed, happy, excited, motivated, and interested. These responses also confirm the success of incorporating an artistic component which was strongly evident in several students. These skills allowed the activity to expand to one that involved multiple senses.

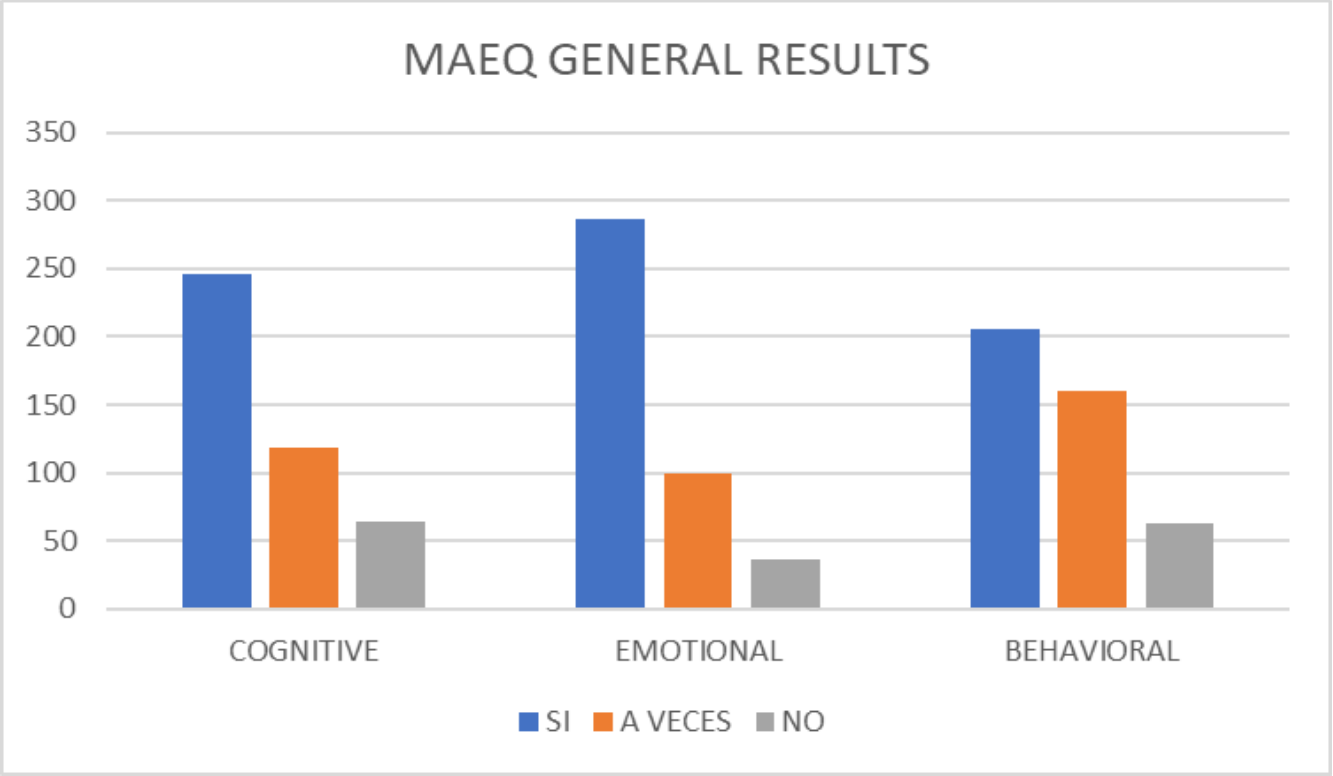
From a linguistic perspective, the session showed an increase in individual output in the foreign language, particularly when students communicated their preferences in terms of materials, colors, requests, etc. This artistic session offered more independent work, opportunities for choice, and outcomes. Students' interests and abilities seemed to have reduced their anxiety levels, fostering an atmosphere that was favorable to free expression in English, as stated by Krashen (1982, p. 31).

4.9.8. General Analysis

In the graphic presenting the questionnaire results with all sessions combined, it was evident that the dimension generating the highest level of engagement throughout the process was the emotional one, in which students mostly selected adjectives such as happy, excited, calm, interested, relaxed, and amused. This was followed by the cognitive dimension, and lastly the behavioral dimension.

Figure 50

Multisensory Activities Engagement Questionnaire General Results



Note: Own elaboration

Coherence was found across the questionnaires, personal diaries, and classroom observations. The most prominent dimension was the emotional one, reflected in students' positive attitudes, joy, curiosity, excitement, and calmness. Evidence also showed that several students activated codes associated with the cognitive dimension. For instance, the code BEHAVCOG appeared in students such as A.A., J.R., C.N., S.P., J.V., E.C., S.A., M.S., E.I., J.D., A.E., and N.O. Cognitive engagement was further observed when students made connections to prior knowledge, applied learning to new contexts, or engaged in problem solving, coded as COGIND (J.D., A.E., A.A., N.O., J.V., S.A., M.S., E.I., C.N., M.S.).

Agentic engagement was also evident, particularly among students who asked for help, something some of them rarely did (e.g., S.P.) and among those who made suggestions for the session, proposed changes, or personalized the assigned activities. This was reflected in the code AGENTPRO (M.S., S.A., J.R., L.P., N.O., C.N., N.M., J.V., D.S., S.A., S.P., A.E.).

In the questionnaire, most students perceived their involvement as intermittent, with more varied responses to Item 11: "I was a student who participated actively in the sessions." This perception may be linked to behavioral engagement, where moments of disconnection were observed, mainly during sessions incorporating elements not typically used in regular English classes such as touch and smell-taste or those requiring more physical involvement such as vestibular and proprioception. These conditions generated temporary instances of social or external disengagement, particularly among boys. However, students' perception of participation increased in activities that encouraged peer interaction or active exploration of the environment, such as taste, smell, touch, and the "all senses" session.

4.9.9. Individual and Collective EFL Output analysis

As was mentioned previously that the individual output, which was generated autonomously by students, was separated from collective output. It was observed through all the instruments that certain sessions elicited higher levels of individual oral participation in the foreign language. The sight-hearing sessions generated higher levels of participation. They were also presented in smell-taste sessions. It was evident that the students S.A., C.N., N.O., A.E, and J.D. were the ones who produced the most output. This is surprising in the cases of A.E. and N.O, since in regular English classes they expressed that they did not like the subject and their output was very low, limited to responding only when they were asked. C.N. stood out particularly in the visual-

hearing session. The students A.A., N.M., J.R., A.B., L.S, produced the least individual output, showing activation in only one or two senses. Nevertheless, their artistic, sensory, and movement-related strengths allowed them to engage in ways that, although minimal, had not been observed before in their regular classes. This was also reflected in the personal diaries.

The sessions that produced the least individual output in the foreign language were proprioception and vestibular. This is consistent with the group graphic (as shown in Figure 18) where these senses also generated the lowest amount of output. The interoception sessions did not generate group output, but they did produce individual output for some students during the activity.

The collective output, revealed especially in sight-hearing and taste-smell sessions, showed group-level use of the foreign language. This occurred for various reasons. For example, when students collectively knew a specific answer and responded in unison, or when they shared the same sensory perception and found the same answer as a group (as shown in the figure 22).

The session that demonstrated the highest level of collective output in English was sight-hearing, with 27 group interventions. This may have resulted from several factors. One possibility is that the planned activities created greater opportunities for collective participation because all of them were looking at the same words and listening to the same information. Another reason may be the western thought about the predominance of the visual and auditory senses in this society, which allows the students to communicate better using these two channels instead of the other senses. (Majid et al. 2018, p. 11369). Additionally, they are accustomed to learning frequently through these two channels. A final factor may have been the use of the textbook in those sessions, which enabled students to focus on the same point, image, or answer

option, thus facilitating identical or similar responses as a group.

The sessions in which no collective output in the foreign language was observed were proprioception and “all senses”. Perhaps due to the lack of habit of having English classes outdoors or using their bodies, the students frequently forgot that they were in an English lesson, as reported in the field diaries. It was necessary to remind them constantly through the input (instructions, materials, examples of the activities, etc.) that the class was meant to be in English.

Chapter 5

The research's conclusions are presented in this last chapter, which should be interpreted as potential conclusions because it was difficult to present "closing/ending" concepts. I then discuss some possible implications of this research. The limitations of this investigation are presented in the third subpart. I then offer some suggestions for anybody who might be interested in carrying out similar studies. The last section analyzed how to carry out additional research that allows enriching the engagement and discovery of the foreign language through the different learning channels in primary school.

5.1. Conclusions

To introduce the linguistic conclusions, it is essential to highlight two important aspects previously discussed in the theoretical framework. The first concerns the complexity of linguistic intelligence, which encompasses more intelligences and channels than those typically emphasized in the curriculum and in "literate culture" for its development. (Gardner, 1983). This aligns with the importance of creating learning environments in which students can learn through various sensory channels and their most developed intelligences. In this study, it was found that there is coherence between students' self-perceived output in the foreign language and the results obtained from the observations and personal diaries, which showed lower levels of production in some sessions than in others. This did not diminish the value of the work conducted in those sessions that recorded the lowest levels of individual output, namely vestibular, proprioception, and interoception, where the main objective was to foster a wide range of input through bodily exploration in the target language. As Krashen (cited by Liu, 2022) asserted "to acquire the language, they should pay more attention to the meaning than the form" (p. 475). In these sessions, both the observations and the personal diaries indicated that the focus was placed more on understanding meaning than the form, and most students indeed comprehended the input, as evidenced by their high levels of participation and acceptance (behavioral and emotional engagement). It was clear, as Krashen's theory (1984) suggested, that English output is not immediate, and that learners require a silent period, during which they should not feel pressured to produce in the target language immediately but should instead be given time to focus on understanding. Both results, the low output levels recorded in these particular sessions and the low levels observed in some students during the whole process, are coherent since students were

not familiar with receiving this type of input through bodily exploration.

On the other hand, it was evident that the sessions with higher levels of output occurred in environments characterized by low anxiety and in which the instruments elicited greater sensations of calmness and relaxation (all senses, taste-smell). In line with Krashen's claims (1984), such environments are more conducive to acquisition than traditional content-driven learning. The sessions that demonstrated the highest levels of collective output were those focused on sight-hearing and taste-smell. In the first case, the wider lexical range available for expressing perceptions in these two senses (sight-hearing) and the habit of using them frequently in English classes probably facilitated students' ability to articulate their ideas; moreover, the combined use of the textbook which predominantly emphasizes these senses, fostered greater group participation.

Regarding taste-smell, the findings were particularly remarkable. These sessions showed the highest levels of spontaneous and individualized output in the foreign language, despite the fact that these senses are among the least studied and least used in foreign-language teaching and learning, often ranked among "the lowest and far removed from the basis of knowledge and understanding" (Majid et al., 2018, p. 11369).

Finally, a varied level of participation was observed throughout each session, in which some students stood out more in some sessions than in others. This made evident the diversity of abilities and sensory channels of receiving and processing input within the group. Contrary to what usually happened in the classes prior to the intervention, where typically barely two students stood out, leading to the perception that only they had abilities to learn English and, consequently, that the others were not good at learning the foreign language.

Considering the engagement part, it is relevant to start recognizing the complexity of Engagement and disengagement found in theory, which interrelated aspects of students' emotion, cognition, social relationships and behavior. (Fredricks et al. 2019). The findings showed that, as the theory suggests, the most easily identifiable dimension was the behavioral one. In the case of the Interoception and Proprioception sessions, where activities involved gamification and goal-oriented tasks, engagement extended beyond following rules; it also fostered positive social engagement that encouraged active participation. This, in turn, activated emotional engagement and even agentic engagement, revealing an interaction between behavioral-emotional and behavioral-cognitive engagement. Such involvement is particularly relevant for students in middle childhood (approximately ages 7-11), who are inherently active, socially oriented, and easily stimulated. (Mah and Ford-Jones. 2012).

The second dimension, emotional engagement, required deeper analysis as transcriptions and questionnaires alone did not fully capture it; careful examination of the video recordings was required. Emotional engagement reached the highest overall levels across sessions, especially in taste-smell, touch, and “all senses” sessions. In contrast, the sight-hearing sessions received the highest number of reactions associated with disengagement with terms such as boring or monotonous; and they were also the sessions in which the greatest number of students indicated they did not enjoy some activities. This may be due to the predominance of these two senses in traditional English lessons, which made the session feel similar to a usual class.

The cognitive dimension was the most challenging one to evidence; it also required a detailed analysis of each student’s participation in all the instruments. Evidence of cognitive engagement appeared in behaviors such as making connections to prior knowledge, applying learning to new

contexts, and problem-solving. Additionally, agentic engagement was observed in students who offered suggestions, proposed changes, or personalized the activities. The social component was highly influential not only in the emotional and behavioral dimensions, but also in the cognitive one; their perception of participation and learning increased in activities that promoted interaction with peers or active exploration of the environment (e.g., taste, smell, touch, and the "all senses" session).

Concerning disengagement, it was evident that the social component generated moments of engagement in most sessions, although in some of them it also led to disengagement. Those sessions that incorporated elements not commonly used in regular English classes (e.g. touch and smell-taste) or that required greater physical involvement (vestibular, proprioception) generated temporary moments of social or external disengagement, particularly among boys, linked more to overstimulation or difficulties with emotional regulation than to a genuine lack of interest; in alignment with the theoretical framework, which notes that some student populations (as males) are more prone to experiencing higher levels of disengagement (Fredricks, 2009). Girls tended to remain more focused during instruction-following tasks, whereas boys displayed increased disengagement during such activities. Boys showed higher engagement in sessions that fostered competition or in which they transformed the task into a competitive activity, even when that was not the original instruction (e.g., proprioception and interoception). Due to several moments of disconnection caused by external or social factors, as mentioned earlier, the dimension that showed the highest level of disengagement was the behavioral one. It was proved that teacher-student relationships could also influence students' disengagement from classwork (Chen et al., 2014). In two sessions, it became evident that, although students initially felt connected to the

topic and motivated to participate portraying cognitive and behavioral engagement, the teacher did not grant them the opportunity to speak. This led to disengagement that lasted for the remainder of the session.

Finally, from the perspective of the teacher's performance and professional insights gained throughout the process, conducting the sessions as originally planned posed several challenges for two main reasons. The first one, the reflection in relation to the professional challenges that, as a teacher we had to face when attempting to expand the learning channels in primary-level EFL classes. These activities often required the preparation of materials and resources that may be affected by external limitations beyond the teacher's control, such as the use of skirts in the girls' uniform, which restricted free bodily movement, weather conditions, schedule changes due to institutional events, lack of resources and curricular pressure to focus only on certain senses and on a standardized, literacy-oriented linguistic perspective (Robinson, K. 2006). The objective to explore English through students' senses meant seeking resources beyond those typically used in the classroom, which resulted in additional personal expenses. Institutional support would be valuable to ensure that this type of sensory exploration could occur consistently in the school environment.

In terms of academic resources, throughout the process, it became evident that there was a deficiency in the textbooks, regarding activities related to multisensory stimuli, particularly those involving smell, taste, touch, and kinesthetic modalities. For this reason, it was necessary to design external materials or artifacts to support these sessions.

Second, from a methodological and methodical perspective, the theoretical literature available on middle childhood was very limited, revealing an important gap for this specific population.

Nevertheless, authors such as Piaget (1971) provided foundational insights that enriched the understanding of students' needs and characteristics to take into account as an EFL elementary teacher. Based on this theoretical grounding, the type of input offered in most multisensory sessions generated positive engagement outcomes for the sample. In addition to intensifying the use of the body (Mah and Ford-Jones, 2012), The sessions utilized concrete materials to facilitate students' conceptualization of their environment, thereby providing a scaffold for the internalization of abstract concepts (Huitt, 2003). Likewise, the sessions offered valuable learning regarding interventions that elicited higher levels of distraction. For instance, activities involving strict instruction-following, individual work, or external materials with which students were not familiar generated greater disengagement than group-based activities or those that included elements of gamification. This aligned with Gardner's perspective on the significance of interpersonal relationships for middle-childhood learners, where they not only strengthen friendship bonds but also develop a sense of self-identity through interaction with others. (Gardner, 2011).

These findings form part of the ongoing journey of teaching, which requires the constant evaluation of methods and methodologies to create increasingly favorable environments for diverse and multisensory learning. Such environments enable students to channel the energy and curiosity characteristic of this developmental stage. As the theory suggests, "there is not one perfect intervention that works for all. Instead, interventionists must be sensitive to person-environment fit" (Fredricks et al., p. 273).

5.2. Implications

The potential effects or consequences of my findings operate at various levels. At the theoretical level, they offer a guiding framework for teachers working with middle-childhood populations who, like the researcher in this project, often lack sufficiently robust pedagogical foundations to fully understand the developmental changes, characteristics, and specific needs of this age group. These needs are not fully addressed in current curricula or in English as foreign language textbooks, which is why this research aims to stimulate new discussions and theoretical connections between middle childhood and the teaching/learning of EFL.

The positive findings observed between the needs of middle-childhood learners, multisensory teaching, and their increased engagement, challenges contemporary educational practices, which continue to prioritize only two senses within academic learning.

Incorporating the body and the full complexity of its sensory channels for receiving information into teaching and learning English, incites to modifying existing policies, curricula, and textbooks in elementary education, which currently perpetuate the Western thought that vision and audition are more objective than other senses (Majid et al., 2011, p. 1).

The practical implication concerns how teachers can meaningfully integrate all sensory modalities into their EFL classes. In this study, context-specific methods were adapted from special education, occupational therapy, and multisensory teaching. It is my hope that these strategies will serve as a guide for educators who wish to take risks in order to increase foreign-language input by drawing on all the channels through which human beings receive information. Becoming more inclusive in pedagogical practices, acknowledging the wide diversity of learning styles and sensory channels that children rely on, may offer a light on the path to fostering

greater engagement in EFL classrooms. As the theory indicates, elementary school is precisely the stage at which disengagement begins to increase (Wigfield et al., 2015, cited in Fredricks et al., 2019, p. 10). Allowing learners to explore the world through a bodily-multisensory approach generated more meaningful learning experiences with the foreign language. This may help students focus on the meaning rather than the form of the language, as suggested by Krashen (cited in Liu, 2022, p. 475).

With greater consistency over time, teachers, institutions and students may become more accustomed to using and recognizing the importance of the whole body in the process of teaching and learning, turning the English class into a space propitious to exploring the world and, consequently, fostering higher emotional, cognitive, social, and behavioral engagement.

5.3. Limitations of the study

It became clear that meeting the proposed objectives was challenging in several sessions, as numerous external factors hindered the effective implementation of the activities. In the sessions focused on learning through movement and bodily engagement (vestibular, interoception, proprioception), unexpected difficulties arose due to weather conditions (which prevented outdoor activities), health-related issues (several students were absent in some sessions), and logistical limitations, for example, the girls' use of skirts on regular-uniform days, which limited their freedom of movement in some sessions (specially interoception, vestibular and proprioception sessions). In some cases, activities had to be cancelled entirely to prevent only one group of students (boys) from being able to participate.

Secondly, the lack of methodologies, methods, and supporting materials for this line of research required additional personal investment both financially (to acquire materials necessary for multisensory exploration) and in terms of time (to create supplementary resources for senses with limited support in the textbooks and to search for ideas beyond the field of EFL, drawing instead on areas with more established multisensory approaches, such as special education, physical education, or occupational therapy).

Lastly, institutional permissions and several extracurricular events prevented the implementation of the final "all the senses session". This session was going to be redesigned to include activities that did not involve the use or consumption of sweets, following a request made by parents. Additionally, the scheduled timeframe for implementing the remaining activities expired, and the students were about to begin their school vacation period, making it impossible to reschedule the session.

5.4. Recommendations

The recommendations were organized into four sections: the first at the sensory level, the second concerning the middle-childhood population, the third addressing logistical considerations and the fourth about the instruments.

While expanding students' learning channels in the English classroom was certainly a challenge, attempting to incorporate all the senses in a single session proved even more demanding, not only due to logistical and time constraints, but also because of the inherent complexity of integrating them coherently. It became evident that, within the natural dynamics of exploration, the senses are gradually activated, and depending on the needs, interests, and

objectives of both students and the teacher, all of them can be progressively incorporated over time. What is most important is that teachers, institutions, and educational policies may recognize the full potential that the body, just like the mind, possesses, and that it should never be detached from foreign-language teaching and learning in primary school. As Mah & Ford-Jones (2012) affirm about this stage being "a time rich in potential that is just waiting to be cultivated" (p. 81).

The second suggestion is about the limited methodologies and methods available in middle childhood. As mentioned previously, the more active sensory-exploration activities such as proprioception and vestibular exercises, were designed based on practices and methods suggested by professionals from other fields (health, special education). However, it is recommended that these activities may be adapted to the specific needs of the context and the age group. In this study, individual activities produced lower levels of emotional engagement compared to group-based activities with a collaborative or play-oriented focus.

Conducting research with this population was highly enriching, as their responses and perceptions were remarkably spontaneous. Nevertheless, it is recommended that data-collection instruments remain discreet, since noticeable technological devices could cause distraction or changes in behavior. In this study, data collection initially relied on recordings through platforms such as Teams or Zoom on a computer. After noticing that large screens altered students' behavior, recordings were switched to a more discreet use of a cellphone, resulting in more natural and less intrusive sessions.

The third suggestion, at the logistical level, it is important to consider elements or resources that may seem minor but can significantly affect sensory dynamics. For instance, during an

interoception session, forgetting the speaker meant that music, something that could have enhanced concentration, was absent. Similarly, previously selected materials intended to support tactile, gustatory or olfactory exploration proved to be essential. It was also necessary to account for external conditions that can positively or negatively affect planned activities, such as the time (some sessions required more time than expected), the schedule (depending on whether students have done a lot or little physical activity prior to class) or the uniform they are wearing (daily or physical-education uniforms, especially considering that skirts may restrict movement for girls).

Finally, it is essential to use multiple instruments and analyze the data from various perspectives to obtain a broader understanding of student engagement. As the literature indicates, engagement is multidimensional and complex (Fredricks, 2019, p. 2), requiring in-depth analysis of each participation, gesture, and situation that arises inside and outside the classroom. Therefore, in order to create a more engaged classroom environment, it is necessary to identify which dimensions of engagement are strongest and which require further strengthening in a particular context.

5.5. Further research

This research generated reflections and potential possibilities for future inquiry across several domains. First, there is a need to expand methodologies and methods through longer periods of implementation. Extending the duration of multisensory interventions may allow for a more exhaustive analysis of students' output through channels they are not accustomed to using for foreign language learning, such as proprioception, vestibular, taste-smell, or interoception. It is likely that, with more time dedicated to stimulate all the senses in English classes, greater input would be provided and stronger associations between bodily experience and the target

language would emerge. Longer-term implementation would also make it possible to determine, with methodological rigor, students' levels of engagement or disengagement in EFL classes.

Second, regarding instructional materials, future research could examine more comprehensively, which sensory channels are most frequently employed in EFL support materials (textbooks, curricula) and from what perspective these senses are being incorporated into the materials provided. In the case of this study, for instance, the textbooks provided by the institution were insufficient for generating linguistic input across all senses. Instead, there was a clear predominance of activities involving vision, with 263 appearances of verbs such as look, read, and follow. Hearing was represented through the verb listen 126 times. Activities that implied touch were mostly limited to writing tasks, including verbs such as write, complete, number, circle, match, choose, label, tick, and order, which appeared 135 times. Only one verb associated with touch "stick" referred to an activity different from writing and it appeared only 10 times. Activities requiring bodily movement or involving other senses (vestibular, interoception, proprioception) were minimal, with the phrase "play the game" appearing only 3 times.

Peer interaction was also scarce, with phrases such as "work with your partner," "choose a friend," and "try to find a person who" appearing only 5 times. Regarding content, very few activities promoted multisensory experiences. The activities found in the food section, for example, focused primarily on grammatical content (e.g., quantifiers, containers) rather than on sensory experiences or the linguistic recognition of gustatory or olfactory sensations. Due to this gap, it was necessary to create additional materials to support the touch, taste–smell, and interoception sessions. The implications, uses, and analysis of the sensory channels promoted by

textbooks (along with teacher's guides and digital platforms) could provide fertile ground for further research.

Third, a contextualized analysis between the mother tongue and the foreign language could be developed, to identify whether linguistic limitations exist when communicating what can be perceived from the world through the senses. Such an analysis could reveal possible social tendencies that prioritize certain senses over others in communication. This would help confirm or refute Majid and Levinson's claim (2015) "it was evident that some senses have less abundant lexical resources due to their level of use and the priority given to them in society" (p.7).

References

Alvarado Arévalo, Y. I., Armijos Ramírez, M. R., Tituana Calderón, G. E., & Alvarado Arévalo, E. E. (2025). Multisensory instruction in English vocabulary acquisition among 3rd graders at a public institution. *Ciencia y Reflexión, 4*(1), 2558–2580. https://doi.org/10.70747/cr.v4i1.218

Arango Patiño, A. (2024). *Using ICTs to promote EFL third graders' engagement* [Master's thesis, Universidad de Antioquia]. https://hdl.handle.net/10495/45482

Arias-Gómez, J., Villasís-Keever, M. Á., & Miranda-Novales, M. G. (2016). El protocolo de investigación III: La población de estudio. *Revista Alergia México, 63*(2), 201–206. https://doi.org/10.29262/ram.v63i2.181

Axelrod, V., Bar, M., & Rees, G. (2015). Exploring the unconscious using faces. *Trends in Cognitive Sciences, 19*, 1–7. https://doi.org/10.1016/j.tics.2014.11.003

Barker, M., Brewer, R., & Murphy, J. (2021). What is interoception and why is it important? *Frontiers for Young Minds*. https://kids.frontiersin.org/articles/10.3389/frym.2021.558246

Božanić Urbančič, N., Battelino, S., & Vozel, D. (2024). Appropriate vestibular stimulation in children and adolescents: A prerequisite for normal cognitive and motor development and bodily homeostasis: A review. *Children, 11*(1), Article 2. https://doi.org/10.3390/children11010002

Braun, V., & Clarke, V. (2021). Thematic analysis: A practical guide (2nd ed.). Sage Publications.

Bryce, D., et al. (2025). Classroom carrying capacity: A resource and limiting factors

framework. *Educational Psychology Review*.

Cambridge Dictionary. (2025). *Sense*. https://dictionary.cambridge.org/dictionary/english/sense

Cassell, C., & Nadin, S. (2006). The use of a research diary as a tool for reflexive practice: Some reflections from management research. *Qualitative Research in Accounting & Management, 3*(3), 208–224. https://doi.org/10.1108/11766090610705407

Council of Europe. (2001). *Common European framework of reference for languages: Learning, teaching, assessment*. Cambridge University Press.

Creswell, J. W., & Creswell, J. D. (2018). Research design: Qualitative, quantitative, and mixed methods approaches (5th ed.). Sage Publications.

DeVault, M. L. (1997). *Talking back: Feminist reflexivity, voice, and resistance in qualitative research*. Qualitative Sociology, 20(1), 109–131. https://doi.org/10.1023/A:1024576908006

Field, A. (2018). Discovering statistics using IBM SPSS statistics (5th ed.). Sage Publications.

Koch, S. C., & Fuchs, T. (2011). *Embodied cognition and interoceptive awareness in therapeutic practices.* Journal of Consciousness Studies, 18(7–8), 179–197.

Cullen, E., & Zobeiri, A. O. (2021). Proprioception and the predictive sensing of active self-motion. *Current Opinion in Physiology, 20*, 29–38. https://doi.org/10.1016/j.cophys.2020.12.001

Croy, I., Sehlstedt, I., Wasling, H., Ackerley, R., & Olausson, H. (2017). Gentle touch perception: From early childhood to adolescence. *Developmental Cognitive Neuroscience, 35*, 1–10. https://doi.org/10.1016/j.dcn.2017.07.009

Dawson, C. (1996). *Gadamer's ontology: An examination of Hans-Georg Gadamer's concept of*

being in relation to Heidegger, Plato, and Hegel [Doctoral dissertation, University of Cambridge]. https://doi.org/10.17863/CAM.6696

Durand, Y., Klein, L., & Marquer, È. (2010). *Bled philosophie*. Hachette Éducation.

Edjidjimo, A. J. (2022). Teaching English to the rhythm of the brain. *Journal of Neuroeducation, 3*(1), 34–52. https://doi.org/10.1344/joned.v3i1.39456

Enriquez, J. (2018, April). *La selección latinoamericana de cerebros* [Video]. TED. https://www.ted.com/talks/juan_enriquez_la_seleccion_latinoamericana_de_cerebros

Farida, H. P., & Marice, S. (2022). Theory of cognitive development by Jean Piaget. *Journal of Applied Linguistics, 2*(1), 55–60. https://journal.eltaorganization.org/index.php/joal/article/view/79/95

Fredricks, J. A., Blumenfeld, P. C., & Paris, A. H. (2004). School engagement: Potential of the concept, state of the evidence. *Review of Educational Research, 74*(1), 59–109.

Fleming, N. D., & Mills, C. (1992). *Helping students understand how they learn*. *The Teaching Professor*, 7(4).

Fredricks, J. A., Reschly, A. L., & Christenson, S. L. (2019). *Handbook of student engagement interventions: Working with disengaged students*. Elsevier.

Fugate, J. M. B., Macrine, S. L., & Cipriano, C. (2018). The role of embodied cognition for transforming learning. *International Journal of School & Educational Psychology, 7*(4), 274–288. https://doi.org/10.1080/21683603.2018.1443856

Gardner, H. (1983). *Frames of mind: The theory of multiple intelligences*. Basic Books.

Gillingham, A., & Stillman, B. W. (1997). *The Gillingham manual*. Educators Publishing Service.

Good, T. L., & Brophy, J. E. (1987). *Looking in classrooms* (4th ed.). Harper & Row.

Gürsoy, E. (2010). Investigating language learning strategies of EFL children for the development of a taxonomy. *English Language Teaching, 3*(3), 164–175. https://files.eric.ed.gov/fulltext/EJ1081808.pdf

Hart, S. R., Stewart, K., & Jimerson, S. R. (2011). The Student Engagement in Schools Questionnaire (SESQ) and the Teacher Engagement Report Form–New (TERF-N): Examining the preliminary evidence. *Contemporary School Psychology, 15*(1), 67–79. https://doi.org/10.1007/BF03340964

Hannant, P., Gartland, R., Eales, H., & Mooncey, S. (2023). A tool to profile neural, sensory, and motor development in children at school entry: Identifying possible barriers to learning and emotional well-being in early childhood. *Support for Learning, 38*(4), 167–177.

He, Y. (2021). Multisensory learning in art museums for people living with dementia: Theory, practice, and implication. *International Journal of the Inclusive Museum, 14*(2), 43–55. https://doi.org/10.18848/1835-2014/CGP/v14i02/43-55

Hernández-Sampieri, R., & Mendoza, C. (2018). *Metodología de la investigación: Las rutas cuantitativa, cualitativa y mixta*. McGraw-Hill Education.

Horkheimer, M., & Adorno, T. W. (2002). *Dialectic of enlightenment: Philosophical fragments* (G. S. Noerr, Ed.; E. Jephcott, Trans.). Stanford University Press. (Original work published 1947).

Huitt, W., & Hummel, J. (2003). Piaget's theory of cognitive development. *Educational Psychology Interactive*. Valdosta State University. http://chiron.valdosta.edu/whuitt/col/cogsys/piaget.html

Jiménez, R. T., García, G. E., & Pearson, P. D. (1996). The reading strategies of bilingual Latina/o students who are successful English readers: Opportunities and obstacles. *Reading Research Quarterly, 31*(1), 90–112.

Kant, I. (1998). *Critique of pure reason* (P. Guyer & A. W. Wood, Trans.). Cambridge University Press. (Original work published 1781)

Kawulich, B. B. (2004). Data analysis techniques in qualitative research. *Journal of Research in Education, 14*(1), 96–113.

Kapp, K. M. (2012). *The gamification of learning and instruction*. Pfeiffer.

Kaya, J., Olaya León, A. del C., Ortega Prieto, P. F., & Toro Mejía, C. (2025). Language pedagogies in Colombian English classrooms: A systematic review of literature from Colombian journals. *Colombian Applied Linguistics Journal, 30*(2), 245–264. https://doi.org/10.14483/22486798.23312

Kuznar, L. A. (2008). *Reclaiming a scientific anthropology*. Altamira Press.

Krashen, S. D. (1982). *Principles and practice in second language acquisition*. Pergamon Press.

Lam, S. F., & Jimerson, S. R. (2008). Exploring student engagement in schools internationally: Consultation paper. International School Psychologist Association.

Lantolf, J. P., & Thorne, S. L. (2006). Sociocultural theory and the genesis of second language development. In B. VanPatten & J. Williams (Eds.), *Theories in second language acquisition* (pp. 201–224). Routledge.

Learn.Genetics. (n.d.). *How our senses work together*. University of Utah. https://learn.genetics.utah.edu/content/senses/worktogether/

Liu, Z. (2022). The interplay of English as a foreign language learners' interest, self-efficacy,

and involvement. *Frontiers in Psychology, 13*, Article 837286. https://doi.org/10.3389/fpsyg.2022.837286

Mah, V. K., & Ford-Jones, E. L. (2012). Spotlight on middle childhood: Rejuvenating the "forgotten years." *Paediatrics & Child Health, 17*(2), 81–83. https://pmc.ncbi.nlm.nih.gov/articles/PMC3299351/

Mahmoud, O., Mahmoud, A., & Mohammed, D. (2022). Student engagement in English language classes: An evaluative study. *Sohag University International Journal of Educational Research, 6*, 15–52.

Majid, A., & Levinson, S. C. (2011). The senses in language and culture. *The Senses and Society, 6*(1), 5–18. https://doi.org/10.2752/174589311X12893982233551

Majid, A., Roberts, S. G., Cilissen, L., Emmorey, K., Nicodemus, B., O'Grady, L., Woll, B., de Sousa, H., Cansler, B. L., & Levinson, S. C. (2018). Differential coding of perception in the world's languages. *Proceedings of the National Academy of Sciences, 115*(45), 11369–11373. https://doi.org/10.1073/pnas.1720419115

Martínez, F. (2002). Las disputas entre paradigmas en la investigación educativa. *Revista Española de Pedagogía*, (221), 27–50.

Matiz, A., Orrù, G., Ciacchini, R., Alfì, G., Gemignani, A., & Conversano, C. (2024). Interoceptive ability and emotion regulation in mind–body interventions: An integrative review. *Behavioral Sciences, 14*(11), Article 1107.

Merleau-Ponty, M. (1962). *Phenomenology of perception* (C. Smith, Trans.). Routledge.

Ministerio de Educación Nacional. (2020, September 29). *Guía No. 22: Estándares básicos de competencias en lenguas extranjeras: Inglés*.

https://www.mineducacion.gov.co/portal/men/Publicaciones/Guias/115174

Merriam, S. B. (1998). *Qualitative research and case study applications in education*. San Francisco, CA: Jossey-Bass.

Miles, M. B., Huberman, A. M., & Saldaña, J. (2014). Qualitative data analysis: A methods sourcebook (3rd ed.). Sage Publications.

Montrul, S. (2013). *El bilingüismo en el mundo hispanohablante*. Wiley-Blackwell.

Morgan, H. (2021). Howard Gardner's multiple intelligences theory and his ideas on promoting creativity. In F. Reisman (Ed.), *Celebrating giants and trailblazers: A–Z of who's who in creativity research and related fields* (pp. 124–141). KIE Publications.

Morgan, K. (2019). Multisensory teaching: Crossing into a new discipline. *Kappa Delta Pi Record, 55*(1), 46–51.

National Council of Educational Research and Training. (2007). *Psychology: Class XI (Chapter 5: Sensation, perception and attention)*. https://epathshala.nic.in/topic.php?id=11114CH05

Nguyen, T. N. M., Whitehead, L., Dermody, G., & Saunders, R. (2022). The use of theory in qualitative research: Challenges, development of a framework and exemplar. *Journal of Advanced Nursing, 78*(1), 21–28. https://doi.org/10.1111/jan.15053

Olofsson, J. K. (2024). Superpower of the nose: How good is the human sense of smell? *Natural History, 133*(1), 22–27.

Oxford English Dictionary. (n.d.). *Engage*. https://www.oed.com

Pashler, H., McDaniel, M., Rohrer, D., & Bjork, R. (2008). Learning styles: Concepts and evidence. *Psychological Science in the Public Interest, 9*(3), 105–119.

https://doi.org/10.1111/j.1539-6053.2009.01038.x

Peavler, J., & Rooney, T. (2009). *Orton–Gillingham teacher manual*. Rooney Foundation.

Pekrun, R., Frenzel, A. C., & Goetz, T. (2006). The control-value theory of achievement emotions: Assumptions, corollaries, and implications for educational research and practice. *Educational Psychology Review, 18*(4), 315–341. https://doi.org/10.1007/s10648-006-9029-9

Penn-Edwards, S. (2015). Visual evidence in qualitative research: The role of videorecording. *The Qualitative Report, 20*(6), 1–13. https://doi.org/10.46743/2160-3715/2004.1928

Piaget, J. (1971). The theory of stages in cognitive development. In D. Green, M. P. Ford, & G. B. Flamer (Eds.), *Measurement and Piaget* (pp. 1–11). McGraw-Hill.

Pishghadam, R., Boustani, N., Gerwien, J., Shayesteh, S., & Abdwani, T. A. (2024). Audio-visual entrainment, cranio-electro stimulation, and sensory involvement: Rival effects on attention and L2 vocabulary retention. *Applied Psycholinguistics*. Advance online publication. https://doi.org/10.1017/S0142716424000419

Rojas, L. (2013). *Discovering and describing all my world: Sensory teaching as a strategy to optimize the school environment and create meaningful foreign language learning in third grade at Manuel Elkin Patarroyo School* [Undergraduate thesis, Universidad Pedagógica Nacional].

Robinson, K. (2006). *Do schools kill creativity?* [Video]. TED Talks. https://www.ted.com/talks/sir_ken_robinson_do_schools_kill_creativity

Seo, H. G., Yun, S. J., Farrens, A., Johnson, C., & Reinkensmeyer, D. J. (2023). A systematic review of the learning dynamics of proprioception training: Specificity, acquisition,

retention, and transfer. *Neurorehabilitation and Neural Repair, 37*(1), 3–19. https://doi.org/10.1177/15459683231207354

Setiawan, A., Munir, A., & Suhartono. (2019). Students' engagement in EFL class through creative teaching. *Jurnal Education and Development, 7*(3), 1–10.

Shams, L., & Seitz, A. R. (2008). Benefits of multisensory learning. *Trends in Cognitive Sciences, 12*(11), 411–417. https://doi.org/10.1016/j.tics.2008.07.006

Shapiro, L. (2019). Embodied cognition and its significance for education. *Educational Psychology Review, 31*(2), 305–323. https://doi.org/10.1007/s10648-018-9457-3

Shepherd, G. M. (2006). Smell images and the flavour system in the human brain. *Nature, 444*(7117), 316–321. https://doi.org/10.1038/nature05405

Simatupang, N., & Yusuf, F. (2024). Project-based learning: Promoting students' engagement in the EFL classroom. *International Journal of English and Applied Linguistics, 4*(2). https://doi.org/10.59890/ijeal.v4i2.3985

Staley, D. J. (2006). Imagining the multisensory classroom. *Campus Technology*. https://campustechnology.com/articles/2006/06/imagining-the-multisensory-classroom.aspx

Staszko, S. M., & Boughter, J. D. (2020). Taste pathways, representation, and processing in the brain. In J. H. Kaas (Ed.), *The senses: A comprehensive reference* (2nd ed.). Academic Press.

Thomas, C. G. (2021). *Research methodology and scientific writing*. Springer. https://doi.org/10.1007/978-3-030-64865-7

Thongsongsee, J. (2022). Exploring EFL teachers' roles and practices in promoting student

engagement. *Thaitesol Journal, 35*(2).

Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes* (M. Cole, V. John-Steiner, S. Scribner, & E. Souberman, Eds.; C. Scribner & S. Souberman, Trans.). Harvard University

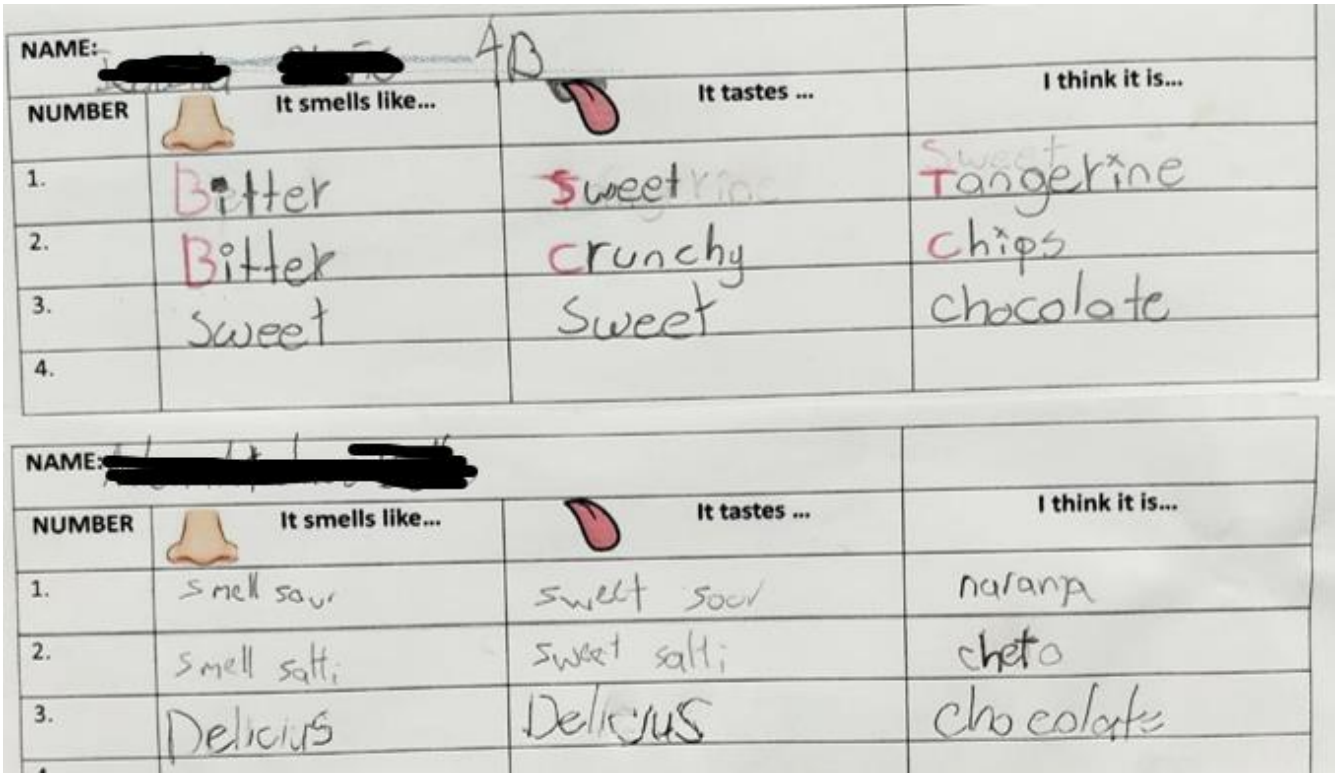
Villamin, P., Lopez, V., Thapa, D. K., & Cleary, M. (2025). A worked example of qualitative descriptive design: A step-by-step guide for novice and early career researchers. *Journal of Advanced Nursing, 81*, 5181–5195. https://doi.org/10.1111/jan.16481

Williams, M. S., & Shellenberger, S. (1996). *How does your engine run? A leader's guide to the Alert Program for self-regulation*. TherapyWorks.

Wilson, R. A., & Foglia, L. (2017). Embodied cognition. In E. N. Zalta (Ed.), *The Stanford encyclopedia of philosophy* (Spring 2017 ed.). https://plato.stanford.edu/archives/spr2017/entries/embodied-cognition/

Wu, S., Wahle, J. P., & Mohammad, S. M. (2025). *The language of interoception: Examining embodiment and emotion through a corpus of body part mentions* [Preprint].

Appendix A: Artifacts



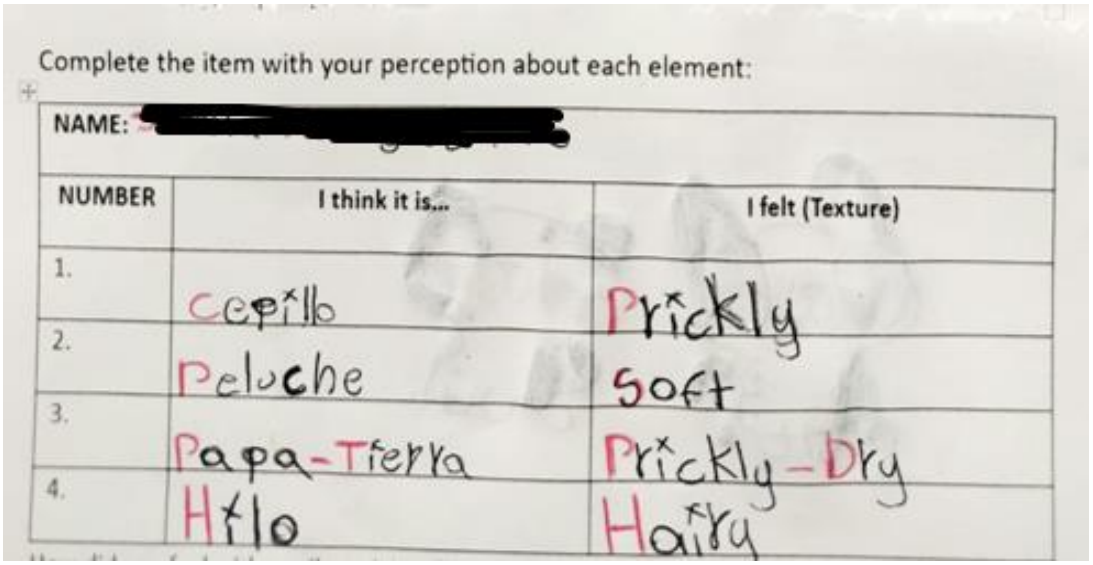
NAME: [redacted] 4B

NUMBER	It smells like...	It tastes ...	I think it is...
1.	Bitter	Sweet	Tangerine
2.	Bitter	crunchy	chips
3.	Sweet	Sweet	chocolate
4.			

NAME: [redacted]

NUMBER	It smells like...	It tastes ...	I think it is...
1.	Smell sour	sweet sour	naranja
2.	Smell salti	Sweet salti	chela
3.	Delicius	Delicius	chocolate

Note: Smell-taste artifact. Own Elaboration.

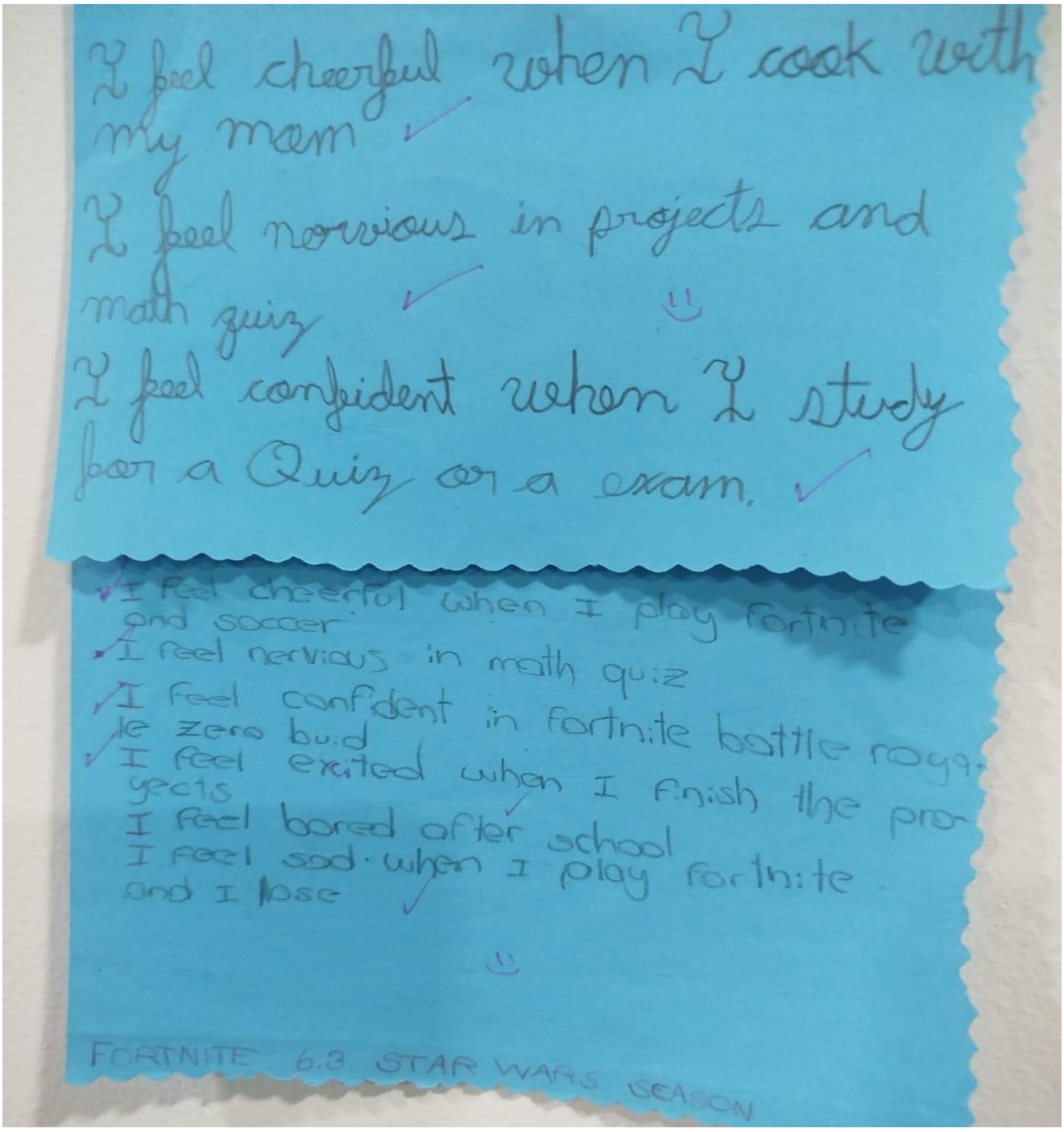


Complete the item with your perception about each element:

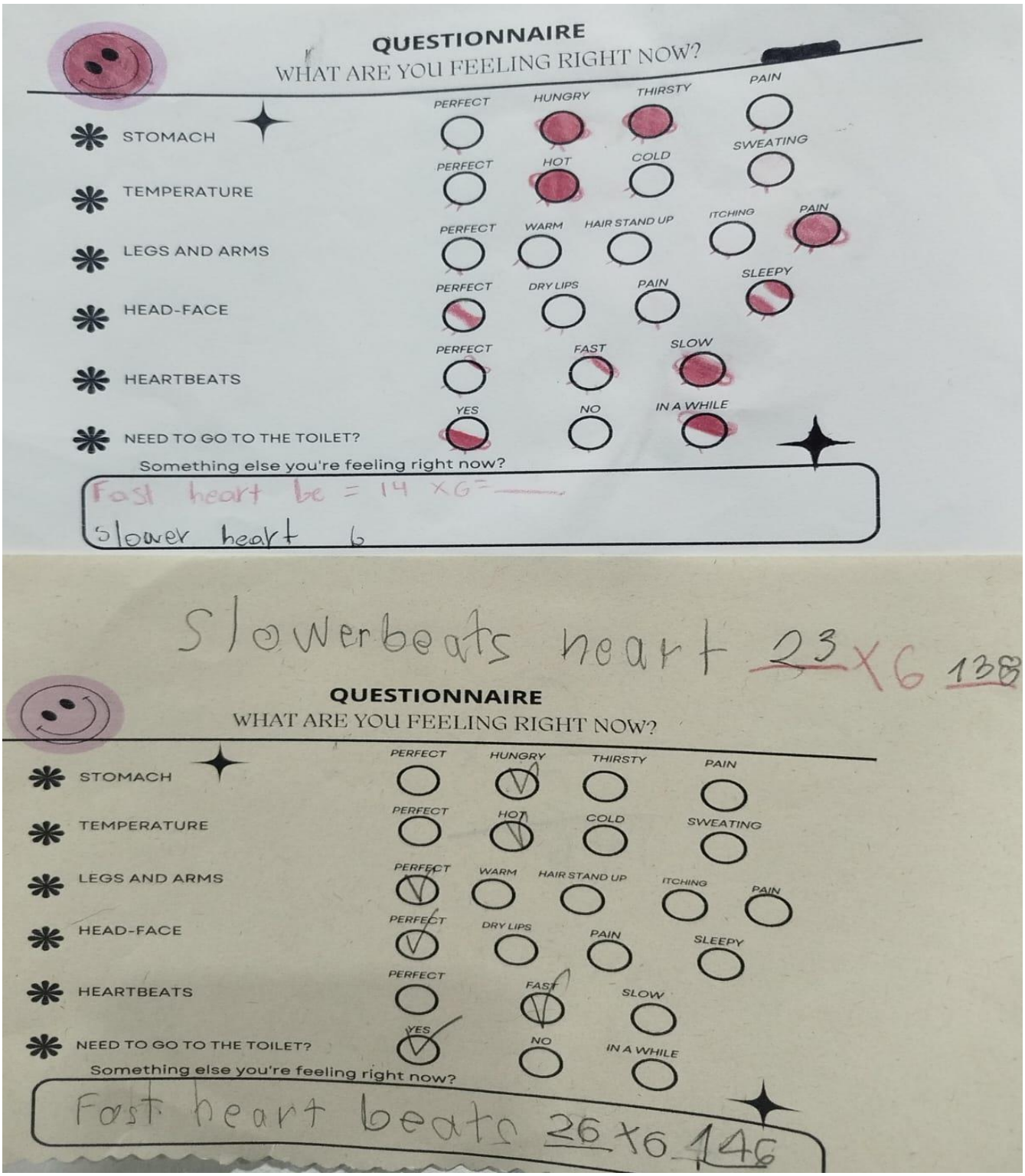
NAME: [redacted]

NUMBER	I think it is...	I felt (Texture)
1.	cepillo	Prickly
2.	Peluche	soft
3.	Papa-Tierra	Prickly-Dry
4.	Hilo	Hairy

Note: Touch artifact. Own elaboration.



Note: Interoception artifact. Own elaboration.



Note:Interoception questionnaire artifact. Own elaboration.

Appendix B: Consent from the school

UNIVERSIDAD PEDAGOGICA NACIONAL	FORMATO
	CONSENTIMIENTO INFORMADO PARA LA PARTICIPACIÓN EN INVESTIGACIONES ADULTO RESPONSABLE DE NIÑOS Y ADOLESCENTES
Código: FOR025INV	Versión: 01
Fecha de Aprobación: 02-06-2016	Página 1 de 3

Vicerrectoría de Gestión Universitaria

Subdirección de Gestión de Proyectos – Centro de Investigaciones CIUP

Comité de Ética en la Investigación

En el marco de la Constitución Política Nacional de Colombia, la Ley 1098 de 2006 – Código de la Infancia y la Adolescencia, la Resolución 0546 de 2015 de la Universidad Pedagógica Nacional y demás normatividad aplicable vigente, considerando las características de la investigación, se requiere que usted lea detenidamente y si está de acuerdo con su contenido, exprese su consentimiento firmando el siguiente documento:

PARTE UNO: INFORMACIÓN GENERAL DEL PROYECTO

Facultad, Departamento o Unidad Académica	Facultad de humanidades. Departamento de lenguas. Maestría en enseñanza de lenguas extranjeras.
Título del proyecto de investigación	"MAKING SENSE OF LEARNING WITH THE SENSES",
Descripción breve y clara de la investigación	Investigación sobre la intensificación de los sentidos en la clase de inglés durante el primer corte del segundo periodo (proprioception, interoception, vestibular, olfactory, hearing, touch, sight,taste).
Descripción de los posibles riesgos de participar en la investigación	Se tendrán en cuenta posibles riesgos en las intervenciones como alergias o trastornos asociados con los sentidos.

<table>
<tr><td>Descripción de los posibles beneficios de participar en la investigación.</td><td colspan="3">Aprendizaje significativo de la lengua extranjera, que tiene como objetivo acercarse más a la adquisición que al aprendizaje, ya que se usarán todos los sentidos en las 14 sesiones asignadas.</td></tr>
<tr><td rowspan="4">Datos generales del investigador principal</td><td colspan="3">Nombre(s) y Apellido(s): Adriana Carolina Contreras</td></tr>
<tr><td>N° de Identificación: [redacted]</td><td>Teléfono:</td><td>[redacted]</td></tr>
<tr><td colspan="3">Correo electrónico: [redacted]</td></tr>
<tr><td colspan="3">Dirección: [redacted]</td></tr>
</table>

PARTE DOS: CONSENTIMIENTO INFORMADO

La entidad [redacted] con domicilio en la ciudad de Bogotá, Dirección: [redacted] Teléfono y N° de celular: [redacted] Correo electrónico: [redacted]

Como adulto responsable del niño(s) y/o adolescente (s) mencionados en el documento. Autorizo expresamente su participación en este proyecto y

Declaro que:

1. He sido invitado(a) a participar en el estudio o investigación de manera voluntaria.
2. He leído y entendido este formato de consentimiento informado o el mismo se me ha leído y explicado.
3. Todas mis preguntas han sido contestadas claramente y he tenido el tiempo suficiente para pensar acerca de mi decisión de participar.
4. He sido informado y conozco de forma detallada los posibles riesgos y beneficios derivados de mi participación en el proyecto.
5. No tengo ninguna duda sobre mi participación, por lo que estoy de acuerdo en hacer parte de esta investigación.
6. Puedo dejar de participar en cualquier momento sin que esto tenga consecuencias.
7. Conozco el mecanismo mediante el cual los investigadores garantizan la custodia y confidencialidad de mis datos, los cuales no serán publicados ni revelados a menos que autorice por escrito lo contrario.

8. Autorizo expresamente a los investigadores para que utilicen la información y las grabaciones de audio, video o imágenes que se generen en el marco del proyecto.

9. Sobre esta investigación me asisten los derechos de acceso, rectificación y oposición que podré ejercer mediante solicitud ante el investigador responsable, en la dirección de contacto que figura en este documento.

Como adulto responsable del menor o adolescente autorizo expresamente a la Universidad Pedagógica Nacional utilizar sus datos y las grabaciones de audio, video o imágenes que se generen, que reconozco haber conocido previamente a su publicación en: Universidad Pedagógica Nacional.

En constancia, el presente documento ha sido leído y entendido por mí, en su integridad de manera libre y espontánea. Firma coordinador responsable del niño o adolescente,

Nombre y firma del coordinador responsable

Fecha: Abril 24, 2025

Declaración del Investigador: Yo certifico que le he explicado al adulto responsable del niño o adolescente la naturaleza y el objeto de la presente investigación y los posibles riesgos y beneficios que puedan surgir de la misma. Adicionalmente, le he absuelto ampliamente las dudas que ha planteado y le he explicado con precisión el contenido del presente formato de consentimiento informado. Dejo constancia que en todo momento el respeto de los derechos del menor o el adolescente será prioridad y se acogerá con celo lo establecido en el Código de la Infancia y la Adolescencia, especialmente en relación con las responsabilidades de los medios de comunicación, indicadas en el Artículo 47.

En constancia firma el investigador responsable del proyecto,

Nombre del Investigador responsable: Adriana Carolina Contreras

N.º Identificación: [redacted]

Fecha: abril 24, 2025

La Universidad Pedagógica Nacional agradece sus aportes y su decidida participación

Appendix C: Parent's Consent Sample

	FORMATO		
UNIVERSIDAD PEDAGÓGICA NACIONAL	CONSENTIMIENTO INFORMADO PARA PROYECTOS DE INVESTIGACIÓN		
Código: FOR026INV	Fecha de Aprobación: 28-08-2019	Versión: 02	Página 1 de 2

Vicerrectoria de Gestión Universitaria
Subdirección de Gestión de Proyectos – Centro de Investigaciones CIUP
Comitè de Ètica en la Investigación

Lo invitamos a que lea detenidamente el Consentimiento informado, y si está de acuerdo con su contenido exprese su aprobación firmando el siguiente documento:

PARTE UNO: INFORMACIÓN GENERAL DEL PROYECTO

Bienvenidos padres de familia al proyecto de investigación "MAKING SENSE OF LEARNING WITH THE SENSES", en la cual los estudiantes del grado 4B participarán activamente integrando los conocimientos planteados en el currículo del CAC con sus sentidos. Este estudio se desarrollará durante el primer corte del segundo periodo. Al participar en este, los estudiantes podrán explorar la lengua extranjera usando todos sus sentidos dentro de los mismos espacios de las clases de inglés. Se destinarán unas sesiones especificas para cada sentido o grupo de sentidos de la siguiente manera:

FECHA	SENTIDO	ACTIVIDAD
Mayo 12-16	**INTEROCEPTIVO**	Feelings spa: Ejercicios de Mindfulness (respiración, conciencia de los órganos internos como estómago, corazón, extremidades y temperatura)
Mayo 12-16	**INTEROCEPTIVO**	Ejercicios de auto conciencia del propio cuerpo incorporando el pulso cardiaco, y el uso de un cuestionario.
Mayo 12-16	**VISUAL/AUDITIVO**	Actividades del material de estudio acompañadas de sonidos, videos 4k e imágenes.
Mayo 19-23	**VISUAL/AUDITIVO**	Actividades del material de estudio acompañadas de sonidos, videos 4k e imágenes.
Mayo 19-23	**PROPRIOCEPTIVO**	Ejercicios que promueven el reconocimiento del cuerpo, especialmente extremidades y conciencia espacial y resistencia necesaria en actividades cotidianas.
Mayo 19-23	**PROPRIOCEPTIVO**	Ejercicios que promueven el reconocimiento del cuerpo, especialmente extremidades y conciencia espacial y resistencia necesaria en actividades cotidianas.
Mayo 19-26	**VESTIBULAR**	Actividades corporales que promueven el equilibrio y orientación espacial.
Mayo 26-30	**VESTIBULAR**	Actividades corporales que promueven el equilibrio y orientación espacial.
Mayo 26-30	**OLFATO Y GUSTO**	Identifica el alimento sin usar la vista: Actividades que promueven una experiencia más cercana con el gusto y olfato en la lengua extranjera, teniendo en cuenta su percepción
Mayo 26-30	**OLFATO Y GUSTO**	Creación de receta. Actividades que promueven una experiencia más cercana con el gusto y olfato en la lengua extranjera, teniendo en cuenta su percepción
Junio 3-6	**TACTO**	Identifica la forma: Identificar diferentes texturas sin usar el sentido de la vista.

Documento Oficial. Universidad Pedagógica Nacional.

	FORMATO		
UNIVERSIDAD PEDAGÓGICA NACIONAL	CONSENTIMIENTO INFORMADO PARA PROYECTOS DE INVESTIGACIÓN		
Código: FOR026INV	Fecha de Aprobación: 28-08-2019	Versión: 02	Página 2 de 2

Junio 3-6	TACTO	Identifica la forma: Identificar diferentes texturas sin usar el sentido de la vista.
Junio 9-13	**Sesión con todos los sentidos**	Creación de manualidad usando todos los sentidos.

Durante este periodo de tiempo (mayo-junio) se realizarán algunas grabaciones audio - voz con fines netamente académicos internos que no serán en ningún momento divulgados públicamente, sino que serán parte de una recolección de datos para ser analizados y socializados al final. Los invitamos a permitir que sus hijos hagan parte de este increíble proyecto junto con la universidad pedagógica nacional.

Datos generales del investigador principal	**Nombre(s) y Apellido(s): Adriana Carolina Contreras**
	Correo electrónico [redacted]
	Dirección [redacted]

PARTE DOS: CONSENTIMIENTO INFORMADO

Yo [redacted], Identificado con Cédula de Ciudadanía [redacted], padre de familia del(a) estudiante [redacted]
con número de identificación [redacted]
¿El (la) estudiante presenta algun tipo de alergia o trastorno asociado a los sentidos (vista, olfato, oído, gusto, tacto)? SI_____NO_X_
¿Cuál(es)?_____

Declaro que:

1. He sido invitado a participar en la investigación y de manera voluntaria he decidido hacer parte de este estudio.
2. He sido informado sobre los temas en que se desarrollará el estudio, han sido resueltas todas mis inquietudes y entiendo que puedo dejar de participar en cualquier momento si así lo deseo.
3. Sobre esta investigación me asisten los derechos de acceso, rectificación y oposición que podré ejercer mediante solicitud ante el investigador responsable, en la dirección de contacto que figura en este documento.
4. Conozco el mecanismo mediante el cual los investigadores garantizan la custodia y confidencialidad de mis datos.
5. La información obtenida de mi participación será parte del estudio y el anonimato se garantizará.

En el marco de la Constitución Política Nacional de Colombia, la Ley Estatutaria 1581 de 2012 "Por la cual se dictan disposiciones generales para la protección de datos personales" y la Resolución 1642 del 18 de diciembre de 2018 "Por la cual se derogan las Resoluciones N°0546 de 2015 y N° 1804 de 2016, y se reglamenta el Comité de Ética en Investigación de la Universidad Pedagógica Nacional y demás normatividad aplicable vigente, se ha definido el siguiente formato de consentimiento informado para proyectos de investigación realizados por miembros de la comunidad académica considerando el principio de autonomía de las comunidades y de las personas que participan en los estudios adelantados por miembros de la comunidad académica.

En constancia, manifiesto que he leído y entendido el presente documento.

Firma,

[redacted]

N° de celular: [redacted]

Correo electrónico: [redacted]

Documento Oficial. Universidad Pedagógica Nacional.

Appendix D: Sample Transcription from the Taste-Smell Session

SESSION # 2

Teacher: Silence please. Thank you so much. Okay guys. For this recipe we need flour

Student A.A: Harina

Comments (Group response): Nooo! (Surprised) EMOIDENT

Teacher: Approximately one cup.

Student D.S: Yo no traje harina

Teacher: Raise your hand if you cannot drink milk. If you cannot use it.

Student A.A: Yo si tomo

Teacher: If you feel stomachache when you drink it…

Student D.S: Yo soy alérgico

Student S. A: No, eso es mentira. D.S toma lactosa

Teacher: Four people. We can replace 1 cup of milk with water ok? That's why I have water here, because we can replace it. We need one egg. We need essence. What is essence?

Comments (Group response): Esencia BEFOLLOW

Teacher: Very good. I brought three different essences.

Student J.R: Esencia de vainilla

Teacher: Coconut

Student L.M: No me gusta

Teacher: I don't like it, or I like it

Comments (Group response): I like it, I don't like it BEFOLLOW

Teacher: Vanilla, Coconut

Comments (Group response): no me gusta, no!! Buhh! SOCENG

Teacher: I don't like it or I like it

Comments (Group response): I don't like it, I like it! BEFENGROUPL2

Teacher: Or vanilla:

Comments (Group response): I like it, I don't like it BEFENGROUPL2

Teacher: Yummy?

Comments (Group response): Yummy!! BEFENGROUPL2 BEHAVEMO SOCENG

Teacher: If you don't like essences, you can say Ms. I don't like essence

Student S.A: ¿A quién no le gustan las esencias? SOCENG

Teacher: If you don't like. It is okay. What is this?

Comments (Group response): canela BEFOLLOW

Teacher: Cinamon

Comments (Group response): ¿cómo se llama?

Teacher: Cinamon. I love cinnamon. Do you like it?

Comments (Group response): yes…Ms. deja oler! (excited) EMOIDENT SOCENG

Student L.P: Ms. que es cinamon ¿Cocoa?

Teacher: No. How do you say canela in English?

Comments (Group response): cinnamon BEFENGROUPL2

Student N.O: ¿Cinamon no es el amigo de hello Kitty? COGIND

Student A.A: Él es cinamon roll

Teacher: I like it or I don't like it (they were smelling and saying I like it or I don't like it)

BEFOLLOW

Student L.P: I don't like it BEFOLLOWL2

Observation: Student J.U approaches to the teacher and said "Ms no quiero"

Teacher: I don't like cinnamon

Student J.V: Ms. I have a question. Puedo partir el huevo, yo sé. A mí me enseñaron.

Observation: The student J.V started to play with the egg **DISENGEXT**

Teacher: This recipe is made for three pancakes. This is why I divide this recipe for three people. So…

Comments (Group response): Quiero leche (excited) BEHAVEMO - **SOCENG**

Teacher: MS. I want milk, please.

Observation: S.A prefers to work alone, Teacher persuaded him to work with someone, nevertheless he didn't want to. Student N.M. (goes to the table to get another ingredient) **DISENGEXT**

Student N.M: Ms. yo quiero huevos.

Teacher: Wait, please.

Student N.M: Ms. pero yo me hago mis propios huevos.

Observation: They start mixing, laughing and talking a lot about it **SOCDISENG DISENGEXT**

Teacher: Now I'm going to give you the egg. Please Jacobo, mix. I'm going to give you the egg

Comments (Group response): ¡Huevos! (excited) **SOCENG**

Observation: The student A.E mixes with his hands, their group were laughing and playing with the ingredients. **DISENBOYS**

Teacher: Don't use your hands. I gave you the spoon.

Student L. P: Ms me echas más leche. Se le regó a A.E.

Teacher: I'm going to check if you need more.

Comments (Group response): Ms. danos mas leche! BEHAVEMO

Teacher: If you need more milk you say Ms. Give me milk please, or I need more milk

Student M.S: More flour BEFOLLOWL2

Student L.M: Ms. me puedes dar mas flour BEFOLLOW

Student C.N: We need more flour BEFOLLOW

Comments (Group response): Ms. more flour BEFENGROUPL2

Student I.R: Ms. more flour and milk BEFOLLOWL2

Teacher: Do you have bowl? Your spoon? When you finish give one part to each person ok? Pay attention to me we are going to add essence. You could say.. Ms. I want cinnamon, I want vanilla, I want arequipe or I want coconunt, please.

Comments (Group response): Vanilla, vanilla. ¿Quién vota por vanilla? SOCENG

Observation: they smell each essence and choose one of them or mixing two or more.

BEFOLLOW - EMOIDENT

Student J.R: Ms quiero más vainilla

Student S.A: Ms. this is the cinnamon. ¿Quién quiere cinnamon? BEFOLLOWL2

Teacher: Mix please. I want… and… ok?

Student J.U: Ms. me puedes dar cinnamon? BEFOLLOW

Teacher: Ms. Please I want to spoons of sugar. Ms.I want one, One and a half.

Student E.C: I want two BEFOLLOWL2

Observation: They mix all the ingredients BEHAVEMO - EMOIDENT

Student S.P: Ms. I want more vanilla please BEFOLLOWL2

Student J.R: I want two, two BEFOLLOWL2

Student I.R: Ms. more milk please BEFOLLOWL2

Observation: After a few minutes, each group completed its mixture. At that point, the class time ended. Subsequently, during the following class session (Technology), the students were in the computer laboratory; however, they approached to the classroom group by group to finish the recipe and add the toppings. EMOIDENT

Teacher: OK, I want to give you your pancake. We have jam, chocolate chips, chocolate sauce, strawberries, banana…. Etc.

Observation: Everyone took their pancake saying the topping they wanted using English BEHAVEMO BEFENGROUPL2

Student E.I: Ms. thank you so much I loved the activity BEFOLLOWL2

Comments (Group response): Thank you Ms. for the class. BEHAVEMO

APPENDIX E. MULTISENSORY ACTIVITIES ENGAGEMENT QUESTIONNAIRE (MAEQ)

	Pon una x en la casilla del emoji que más te identifica para cada afirmación.	 SI	 A VECES	 NO
11	Fui un(a) estudiante que participó mucho en las sesiones.			
1	Usé el vocabulario en inglés sobre los sentidos en las sesiones.			
10	Presté atención a las indicaciones dadas en las actividades			
7	Me sentí feliz durante las sesiones multisensoriales.			
2	Fue fácil prestar atención y esforzarme en las actividades multisensoriales.			
12	Realicé preguntas constantemente en las sesiones.			
9	En las sesiones multisensoriales trabajé fuertemente.			
3	Pude expresarme fácilmente con mis ideas y mi cuerpo.			
5	Pienso que aprender inglés con actividades multisensoriales es interesante.			
8	Me conecté fácilmente con las actividades propuestas.			
4	Estoy aprendiendo cosas nuevas en las sesiones multisensoriales.			
6	Disfruté las sesiones multisensoriales con mi participación activa.			

¿Hubo alguna sesión o actividad que no te gustó? Si____ no_____ ¿Cuál o cuáles no te gustaron?

_____ ¿Por qué crees que no te gustaron? _____

¿Hubo alguna o algunas sesiones que te llamaron la atención o te gustaron? Si____ No____ ¿Cuál o cuáles fueron?

_____ ¿Por qué te gustaron? _____

¿Cambiarias o agregarías algo a las sesiones multisensoriales realizadas? Si___ no___

¿Qué cambiarías o agregarías? _____

¿Cómo te sentiste en las actividades multisensoriales?

¿Cómo te sentiste en las actividades multisensoriales? Puedes encerrar una o varias respuestas:

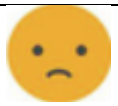
feliz - sorprendido - aburrido(a)- participativo(a) - motivado(a) - emocionado(a)- interesado(a)- confundido(a)

estresado(a)- nervioso(a) - tranquilo(a) - relajado(a) - preocupado(a) - tímido(a) - inteligente - divertido(a)

APPENDIX F PILOTAGE MAEQ QUESTIONNAIRE

MULTISENSORY ACTIVITIES ENGAGEMENT QUESTIONNAIRE

Pon una x en la casilla del emoji que más te identifica para cada afirmación.

	AFIRMACIÓN	 SI	 A VECES	 NO
11	Me sentí interesado en aprender inglés con las actividades multisensoriales.			
1	Pienso que las actividades en las sesiones fueron útiles para mi vida.			
15	Me gustaron las sesiones multisensoriales.			
29	Fui un(a) estudiante que participó mucho en las sesiones.			
2	Usé el vocabulario en inglés sobre los sentidos en las sesiones.			
21	Di lo mejor de mí en las sesiones multisensoriales.			
25	Presté atención a las indicaciones dadas en las actividades			
9	Pude darle solución a los problemas fácilmente con mis nuevas ideas.			
16	Me sentí feliz durante las sesiones multisensoriales.			
27	En las sesiones me desconcentraba fácilmente haciendo otras actividades.			
3	Fue fácil prestar atención y esforzarme en las actividades multisensoriales.			
30	Realicé preguntas constantemente en las sesiones.			
17	En las mañanas quería asistir a las sesiones multisensoriales.			
22	En las sesiones multisensoriales trabajé fuertemente.			
7	Pude expresar mis ideas fácilmente.			
12	Pienso que aprender inglés con actividades multisensoriales es interesante.			
10	Pude realizar mis creaciones solo(a) con ideas que fui creando poco a poco.			
23	Participé más en las actividades multisensoriales que en las clases tradicionales.			
19	Conecté con mis compañeros en las actividades.			
28	En las sesiones se me pasó el tiempo muy rápido porque estaba muy ocupado(a).			
20	Me conecté fácilmente con las actividades propuestas.			

	AFIRMACIÓN	 SI	 A VECES	 NO
4.	Fue complicado usar el inglés en las sesiones.			
8.	Estoy aprendiendo cosas nuevas en las sesiones multisensoriales.			
13	Disfruté las sesiones multisensoriales con mi participación activa.			
14	Pienso que aprender inglés con los sentidos es aburrido.			

¿Hubo alguna sesión que no te gustó? Si____ no_____

Si respondiste sí. ¿Cuál o cuáles fueron? _____

¿Por qué no te llamaron la atención? _____

¿Hubo alguna o algunas sesiones que te llamaron la atención o te gustaron? Si____ No____

Si respondiste sí. ¿Cuál o cuáles fueron? _____

¿Por qué te llamaron la atención o te gustaron? _____

_____

¿Cambiarias o agregarías algo a las sesiones multisensoriales realizadas? Si___ no___

Si respondiste sí. ¿Qué cambiarías o agregarías? _____

_____

¿Cómo te sentiste en las actividades multisensoriales? _____

¿Cómo te sentiste en las actividades multisensoriales? Puedes encerrar una o varias respuestas:

Cheerful surprised bored sleepy participative Motivated Excited interested stressed

Nervous Calm Relaxed Worried Embarrassed Clarity Amused Confused distracted

¿Crees que aprendiste algo nuevo? Si_____ no_____

Si respondiste sí. ¿Qué aprendiste? _____

_____