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Joint attention, multimodality, bilingualism and L2 in a scientific enlacement in literature: an integrative review / *Atenção conjunta, multimodalidade e L2 em enlace científico na literatura: uma revisão integrativa*

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ABSTRACT
This article is an integrative review and contemplates the interweaving of theoretical constructs related to second language acquisition and joint attention. It was proposed, as the main goal, to investigate national and international scientific works on second language acquisition and joint attention, including publications in the period 2002 to 2023. Specifically, the objective was to synthesize the data obtained, identify privileged contexts, recognize the types of gestures most addressed, verify the prioritized age group and the most recurrent languages. This scientific research lies on theories about multimodality authored by Kendon, McNeill, Cavalcante, Fonte, amongst others; on second language acquisition (SLA) research studies carried out by Stam, Grosjean, Moraes; and on joint attention studies in Tomasello's, Carpenter's and Costa Filho's works, amongst others. The methodology comprises an integrative literature review and included the selection of descriptors and search in nine databases, whose sample constituted a survey of national and international investigative studies. Literature references searching in the area was guided by exclusion and inclusion criteria. Results showed two studies on the intersection of the referred themes in Brazil and ten works integrate the entire scope of the inclusion criteria globally. We achieved the research objectives by investigating studies, synthesizing data, identifying that the privileged context was the one of higher education at a graduation level, recognizing that deictic gestures had a higher occurrence nationally, adults were the prioritized group and English was the most studied language. The scientific contribution lies in the validation of the empowerment that joint attention offers to language, its essential nature for acquisition and enrichment of new research in this area.
KEYWORDS: Joint attention; Second language acquisition; Gestures; Multimodality.

RESUMO
Este artigo é uma revisão integrativa e contempla o entrelaçamento dos construtos teóricos relativos à aquisição de L2 e atenção conjunta. Propôs-se, como objetivo geral, investigar trabalhos científicos nacionais e internacionais sobre os referidos temas, incluindo publicações no intervalo dos anos 2002 a 2023. Especificamente, objetivou-se sintetizar os dados obtidos, identificar contextos privilegiados, reconhecer os tipos de gestos mais abordados, verificar a faixa etária priorizada e os idiomas mais recorrentes. A pesquisa fundamenta-se nos pressupostos teóricos sobre multimodalidade desenvolvidos por Kendon, McNeill, Cavalcante, Fonte, entre outros; em pesquisas sobre aquisição de L2 de Stam, Grosjean, Moraes; e em estudos referentes à atenção conjunta nas obras de Tomasello, Carpenter, Costa Filho, entre outros. A metodologia abrange uma revisão integrativa da literatura e compreendeu a seleção de descritores e busca em nove bases de dados, cuja amostra constituiu levantamento de estudos investigativos nacionais e internacionais. Buscas por referências na literatura da área foram guiadas por critérios de exclusão e de inclusão. Como resultado, evidenciaram-se dois estudos relativos ao cruzamento dos temas em esfera nacional e dez obras integram todo o escopo dos critérios de inclusão em âmbito internacional. Alcançamos os objetivos da pesquisa ao investigar estudos, sintetizar dados, identificar que o contexto privilegiado foi o de educação superior no nível de graduação, reconhecer que os gestos dêiticos tiveram maior ocorrência em domínio nacional, os adultos foram o grupo priorizado e o inglês foi o idioma mais estudado. A contribuição científica reside na validação do empoderamento que a atenção conjunta oferece à linguagem, seu caráter essencial para a aquisição e enriquecimento de novas pesquisas na área.
PALAVRAS-CHAVE: Atenção Conjunta; Aquisição de L2; Gestos; Multimodalidade.

1 Introduction

Scientific research that integrates joint attention, multimodality and Second Language Acquisition (SLA) - related topics promotes a dialogic relation between the fields of language acquisition, education and applied linguistics, enabling the mutual enrichment of the respective knowledge domains. Therefore, research on joint attention in L2 multimodal acquisition constitutes our most specific interest.

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In the aforementioned scenario, we highlight researchers whose works embrace a multimodal approach to language processing, in which both gestures and vocal production combine in a single cognitive array, as advocated by Kendon (2004), McNeill (1992), Stam (2014), Fonte (2014), Cavalcante (2018). In addition, as a way to support this paper composition, we included SLA studies from authors like Stam (2014) and Moraes (2018) to the theoretical framework. In that regard, Stam (2014) advocates in favor of gesture studies in SLA and language education, firmly adopting McNeill's multimodal perspective, reassuring that, in reference to language, verbal and imagistic aspects should be considered.

Internationally, there are theorists that focus on joint attention research, like Tomasello (1999), who proposed different types of joint attention: direct attention, check attention and follow attention. Regarding the concept of joint attention, Tomasello (1988) and Tomasello and Todd (1983) refer to the shared focus of two or more individuals in an object or event, creating a triadic relation, that is, the constitution of a joint attention scene derives from the alignment of attention due to a clue provided by an initiator, who is accompanied by one or more interlocutors.

Besides Tomasello, there are other researchers, like Carpenter (2009), who emphasizes, in her studies about joint action in infancy, the capacity of engagement and participation of 1 year old babies during joint action episodes. Moreover, Carpenter; Nagell e Tomasello (1998), who researched the diverse behaviors observed in babies, ranging from 9 to 15 months, pointed out the emergence of an understanding of the other as an intentional being, whose attention towards objects might be shared, followed or directed; as well as Bruner (1974, 1983), who investigated children's actions as predictors of language acquisition and the interrelation between playing, language and thought. Nationally, Costa Filho (2017) brings contributions from his scientific work on linguistic reference in joint attention. In terms of second language acquisition contributions, Moraes (2018), in accordance with conceptions by Grosjean (2018) on bilingualism and L2, proposes discussions about the quality of language education towards an effective L2 learning by deaf students. Findings indicated that the group with major outstanding academic achievements in L2 was the one with a bilingual teacher, promoter of interactions among the students, in direct contact with all of them. Despite the main focus of Moraes' (2018) study is on L2 learning by atypical individuals and that the author refers to the use of Libras (Brazilian Sign Language) as a mediator language in teacher-student interactions, the clarified context refer to the joint attention episodes, multimodally formed, facilitating SLA.

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From this standpoint, research on multimodality in SLA from joint attention scenarios constitute a major domain of interest for our work. We believe in the influence of speech-gesture relation in the process of SLA and in the relevance of joint attention as a locus of shelter and promotion for this multimodal production. Hence, first and foremost, under the notion of joint attention composed by multimodal language resources, two questions fostered this paper construction: Which academic productions enlace joint attention and SLA theoretical assumptions in the recent national and international scientific literature (2002-2023)? Which are the contexts, types of gestures/study objects, age range and language(s) debated and prioritized in the studies? Considering the inquiries raised and with the goal of addressing them, we proposed, as general objective, to investigate national and international scientific works on joint attention and SLA; and, precisely, we will seek to recognize the privileged contexts, identify the prioritized age range(s), recognize gesture type(s)/study object(s), as well as identify the most recurrent language(s).

This way, the study analysis object comprises data related to national and international publications about SLA and joint attention. As to the assumptions previously explained, we restate the scientific value of our research, by providing theoretical enhancement and advancement to the fields of Psycholinguistics, Education, Applied Linguistics and Language Acquisition. Subsequently, we will discuss theoretical issues about joint attention and SLA.

2 Joint attention and Language

In the area of joint attention and language studies, Bruner (1974) and Tomasello's (1999; 2019) contributions are remarkable. Bruner (1975), who characterized joint attention as a triadic relation in the core of language acquisition, conducted a pilot research related to joint attention and conjoined activity regulation in a mother-baby reciprocity setting, in which he alludes to the ritual in mutual play as a way to access understanding of the language formal structures development.

Tomasello (2019) elicited the same concept of joint attention as triadic social interaction between an adult, a child and an object or scene. According to the author, from 9 months, the baby is already able to participate effectively in joint attention scenarios, in triadic interaction situations. He also highlights the emergence of joint attention behaviors in 9-month-old children, thereby enabling the identification of an emergent comprehension of the other person by the children, with whom they would be able to establish social triangular interactions, and whose mutual attention

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focus towards an object or scene, can be followed, directed and shared. In agreement with the author, 6-month-old babies only display the ability to establish dyadic interactions, which can be either with an adult or an object. In this regard, on the contrary, Bruner (1975) argues that 6-month-old babies are able to engage in joint attention as interactive partners.

In investigative studies on 9-15-month-old babies, Carpenter, Nagel e Tomasello (1998) recognized three types of joint attention: (a) 'Check attention"; (b) 'Follow attention' and (c) 'Direct attention', which represent the joint attention behaviors observed in babies from 9 months and an emergent perception of the other person in triadic interactions, in which the focus of attention towards an object or external event can be followed, directed and shared, as previously stated. Todisco et al. (2021) had as research findings that the shared attention on an object is, most of the time, preceded and accompanied by what they call 'deictic communication'. Furthermore, the authors verified that children are synchronically multimodal and, thus, communicate information via speech, pointing gestures and eye-gaze. From this perspective, Kontogiorgos et al. (2018) investigated different types of eye-gaze in 'situated interaction' contexts and noted that such study enabled the researchers to carry out an exploration of multimodal and multiparticipant behaviors of changing shifts in interaction.

In Brazil's national territory, in his studies on joint attention and language, Ávila-Nóbrega (2017) presents a notion of children as attentional beings that interact multimodally in joint attention collaborative situations. By the way, the author elicits the idea of 'attentionality', instead of Tomasello's (2017) 'intentionality', for he argues that realizing children's true and clear understanding of others' intentional actions is uncertain. Regarding the emergence of multimodal instances in joint attention, Ávila-Nóbrega and Cavalcante (2012) published a work in which they explored two mother-baby dyads, in naturalistic situations. Additionally, Costa Filho e Cavalcante (2013) discuss issues about joint attention and linguistic reference.

Moreover, in Brazil, Melo (2015) carried out a study on joint attention from the multimodal language perspective, in which she focuses on the analysis of joint attention episodes between teachers and children in the process of acquiring the Portuguese language. During research, the author makes assumptions about the onset of spontaneous actions and the emergence of what she called multimodal behaviors and movements, as language is dynamic and multimodal; apart from that she elicits two new ways of joint attention: a 'redirected attention' and a 'collective/collaborative attention'. According to the author, in the latter, the child attentively collaborates with the maintenance of a triadic relation composed by one or two adults and a child

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and/or his/her peers; in the case of 'redirected attention', the child is capable of redirecting the attention that was on a first object to another object, without losing sight of that first object, placing it in the same interaction.

Given the elucidated scenario, we can observe that, from the elicited studies, language is multimodally accessed by interactive partners when maintaining mutual attentional focus on objects and/or scenes in joint attention. According to Costa Filho (2017), deictic pointing and eye-gaze act in joint attention interactions. Afterwards, we will discuss gestures role from the multimodal language perspective.

3 Gestures, Multimodality and Language

In this section, we allude to the multimodal nature of language, based on the multimodal perspective, in which speech and gestures are constituted, indissociably, from a single cognitive array, forming a meaning integrated system, as claimed by Kendon (2004); McNeill (2006) and Fonte (2014). Accordingly, gestures are co-participants in the process of language acquisition, and should be seen as aspects of a unified conceptual structure that underlies the same psychological structure, that is, the same cognitive matrix (McNeill, 1985, 1992).

In that regard, the theoretical framework of reference studies developed by Kendon (2004) and McNeill (1985, 2006), whose research focuses on adult individuals, supports investigative enterprises on language acquisition, nationally, nevertheless, local researchers, like Cavalcante (2018), Fonte (2011, 2014) and Barros and Fonte (2016) have productions that are guided towards the role of gestures in language acquisition by the child, claiming the hypotheses that children enters language from a prosodic-gestural framework, in which speech-gesture productions are recognized as linguistics. This way, Fonte (2011) argues that in order to ensure understanding of the child's language acquisition trajectory it is essential "to recover the multimodal language processing" (Fonte, 2011, p. 45). To Barros and Fonte (2016), language is formed by different multimodal elements, which are structured through speech and/or gesture production, being privileged depending on the individual's characteristics, the occasion and the context in each interaction.

In the United States arena, Goldin-Meadow e Alibali (2013) propose declarations on the importance of gestures, mainly in language acquisition by the child and point out their benefits in language comprehension. In accordance with the authors, gestures serve as an access path to

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cognition and reflect the speakers' thoughts. Thus, they suggest that stimulating gestures use could facilitate a new alternative route so that teachers and other professionals can have a broad understanding of speakers' communication patterns. Furthermore, they highlight that gestures offer the essential elements, serving as building blocks to build/develop language, by depicting children in the process of acquiring a language and that, when building these blocks, in a creative and unique way, they are creating language. Plus, Novack e Goldin-Meadow (2015) argue that learning through gestures is a generalized phenomenon throughout life. According to Kendon (2017), hands and vocal production get together in coordinated movements to establish a relation of meaning, in a semantic interaction, originating a combined meaning. Out of this semiotic combination, essential from the point of view of the language dynamic dimension, a dynamic process of utterance and speech arises, circumstance in which images and vocal production influence each other mutually, in the growth point that is composed of these two modes, forming an image-language combined code, as stated by McNeill e Duncan (2011). In the following section, we describe the methodological procedures.

4 Methodology

This study is a scientific literature integrative review, in which data collection about national (Brazilian) and international (other countries worldwide) research and publications comprise scientific works that are in the intersection of theoretical constructs on SLA and joint attention. Selected descriptors were: Joint Attention and Second Language Acquisition (SLA). The main database platforms used were: Scielo, TEDE da Unicap, BDTD, Periódicos CAPES, DOAB, NDLTD, AnpadSPELL, as well as Google Scholar browser, including publications within the period of the years 2002 to 2023.

Data analysis comprised the identification of published scientific work, in Brazil and abroad, in which there was a connection of theoretical assumptions related to joint attention and SLA. The searching process in the literature was conducted and guided by inclusion and exclusion criteria, as we will see further. In our research context, we opted, then, for the crossing of descriptors, based on the study leading question, which were submitted to the same filters of language and period of time, as well as inserted one by one, linked by the connectors 'E' or 'AND', depending on the platform, with the purpose of assuring the research methodological rigor, also creating a bond between the research leading questions terms of interest, providing completeness to the searching

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strategies and delimiting the findings to the area of interest, according to theories by Albuquerque *et al*. (2021). Inclusion criteria referred to works that comprise joint attention theories, multimodality in SLA, in PhD Thesis, Masters dissertations and published scientific papers in scientific journals from the year 2002 to 2023, which corresponds to a time period of more than 20 years. We considered only field research; studies that included joint attention as part of their objectives; and studies with diverse terminology, for example, 'joint engagement'; 'shared attention'; 'embodied actions'; 'embodied intentions'; 'joint action'; 'visual coordinated attention'; 'attentional tuning'; 'multimodal acts/actions'; 'embodied resources'; 'embodied practices'; 'multimodal package'; 'joint attention mechanisms'; 'multimodal communicative behaviors'; 'deictic episodes'; 'dynamic eye-gaze'; 'rhythmic movements'; 'attention choreographies'; etc., that could relate to the core theme.

Regarding the exclusion criteria, they referred to publications that enclosed literature reviews or theoretical and principles approach propositions on the themes; those with a different topic from the ones proposed in the data collection inclusion criteria, as well as, the works that covered only partially the core of theoretical constructs, that are so relevant and appropriate to the bibliographic collection, serving only as theoretical reference in one or some specific areas. Some studies were also excluded; those with atypical case contexts. Methodological procedures followed steps: (I) keywords selection to cross terms; (II) division of crossings in two (2) groups: a) Joint Attention/SLA and b) Joint Attention/Second Language Acquisition (SLA); (III) data collection, displayed through two (2) flowcharts and eight (8) graphs that illustrate the current overview of the themes of interest to our research, in the scientific literature in the referred area. For their part, either the flowcharts or the graphs are subdivided in two (2) categories: I. National findings (Brazil) and II. International findings (other countries). The graphs 1-4 compose the national findings and the graphs 5-8, the international ones. Within the national category, addressed topics are: a. privileged contexts; b. most studied types of gestures; c. age range; d. most recurrent and referred to as L2 languages; and within the international findings category, addressed topics are: a. privileged contexts; b. age range; c. study objects; d. most recurrent and referred to as L2 languages.

With regards to the criteria used to analyze the *corpus,* we started with our proposed goals and we identified each topic to be investigated: (i) context; (ii) age range; (iii.a) types of gestures/(iii. b) study objects; (iv) language. After that, with a view to substantiating the data analysis of each of the addressed topics, we elicited criteria for each one of them, as follows:

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(i) Context – refers to the academic context, in which the research was developed, for example, if it was in a higher education, preschool education, basic education or vocational education setting;

(ii) Age range – the age range was delimited, as follows: babies (9-10 months), children (2-3, 3 and 8 years old), adolescents (high school) and adults (21-22 years old);

(iii) (iii.a) Gesture type – we consider the gestural dimensions proposed by McNeill (1992), characterized by: iconic gestures- the ones that present concrete images of entities and/or actions; metaphoric gestures– the ones that represent abstract content; deictic gestures– those used to 'point', with an extended pointer finger or any other body part or object being held; and, beats gesture- in which the hands make rhythmic beats, like a snap of hands up or down, back and forth, rhythmically with speech, in their prosodic points. Thereby, we present the gestural configurations that integrate the gesture typology developed by Kendon (1996): gesticulations – gestures produced with arms and legs and/or head, legs and feet; speech-framed gestures– complete a slot in a sentence, occupying a gap that fills a grammar slot, in synchrony with speech; emblems– gestures that are culturally conventionalized and specific, with shapes and meanings that vary depending on the place; pantomimes– gesture or a sequence of gestures that communicate a sequence of narrative events, produced without speech; and signs– a sign language lexicon. Moreover, other gestures can emerge, being identified and included in the analysis. (iii.b) Study objects- identification of each study object(s) within the scope of the common object which is SLA and joint attention;

(iv) Language – examination of the studied language(s) as L2 in analyzed research.

Furthermore, towards a precise exhibition of the findings, we observe flowcharts 1 and 2 used in the works selection process in order to build the research *corpus*, as follows:

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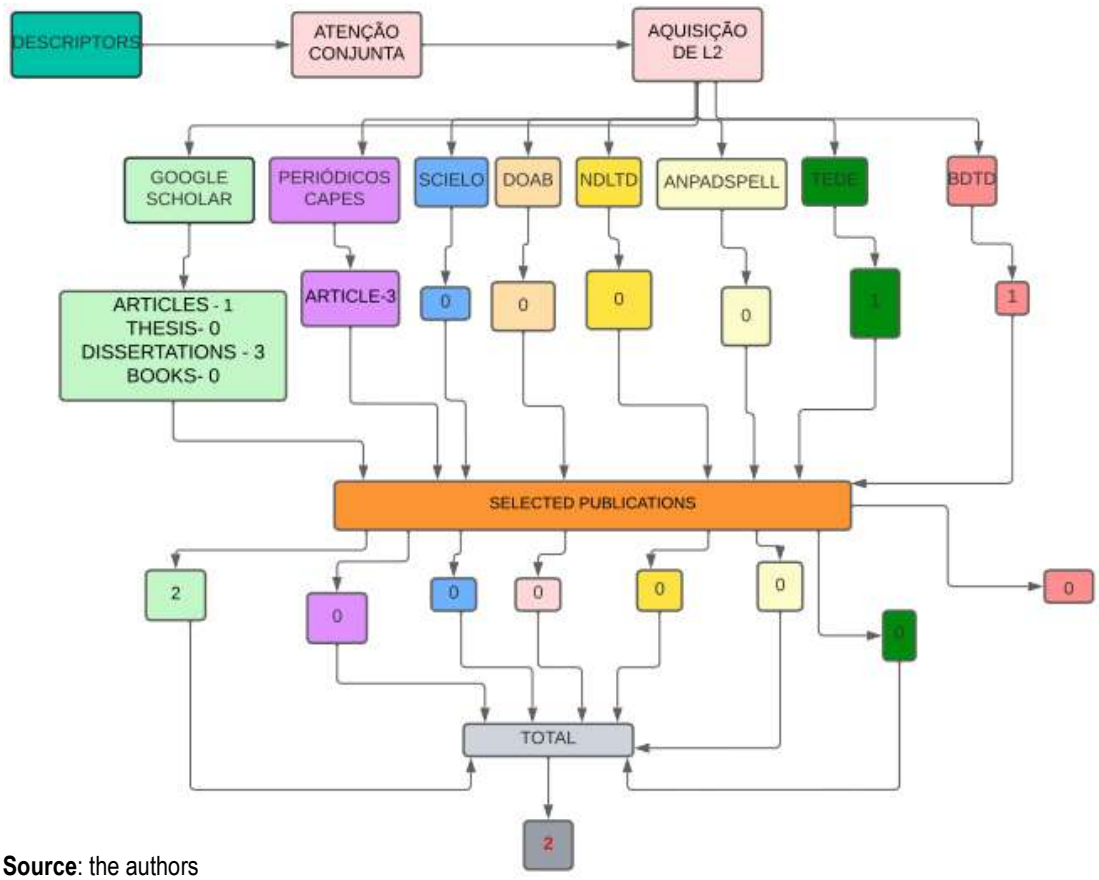
Figure 1: Flowchart 1: national publications



Source: the authors

Flowchart 1 illustrates collected data, which were three (3) dissertations and one (1) article, on the database platform Google Scholar; only one (1) dissertation on Tede of Unicap, and one (1) dissertation on BDTD. However, despite referring to joint attention, only one (1) dissertation and one (1) article that were published in a journal, both found on Google Scholar, comprised joint attention contents in their research objectives. Additionally, two (2) dissertations, one from Tede and the other one from BDTD were repeated, and also included on Google Scholar platform. Consequently, after due deletions, considering exclusion criteria, the selected publications totalized two (2) works.

Hereinafter, we observe flowchart 2, with refined data about international publications, that is, other countries, except Brazil, as previously indicated:

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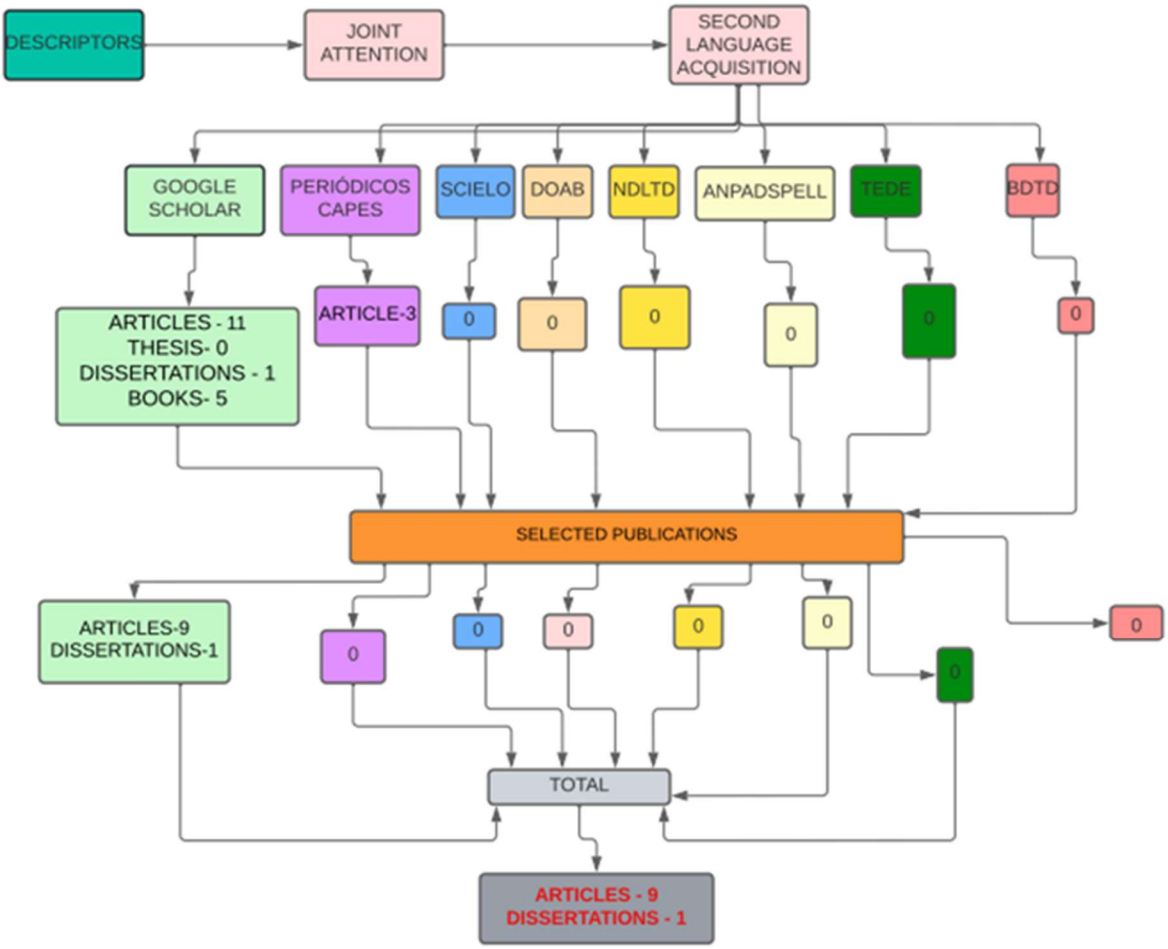
Figure 2: Flowchart 2: international publications



Source: the authors

Above, in flowchart 2, we notice, from searching the platforms, a total of seventeen (17) findings: eleven (11) articles, one (1) dissertation and five (5) book chapters derived from *Google Scholar*, three (3) other articles were found on '*Periódicos da Capes' (*Capes Journal), but they are repeated on this platform. Thus, we suppressed repeated works, book chapters, and those studies related to perspectives, principles, theories and literature reviews, according to the research ongoing exclusion criteria, with the inclusion of nine (9) articles and one (1) dissertation, totalizing 10 publications.

Subsequently, in the '*Results Presentation and Discussion*' section, aiming at disclosing the findings, graphs will be displayed in a way to show the data collection results scenario related to the literature integrative review, with appropriate discussion.

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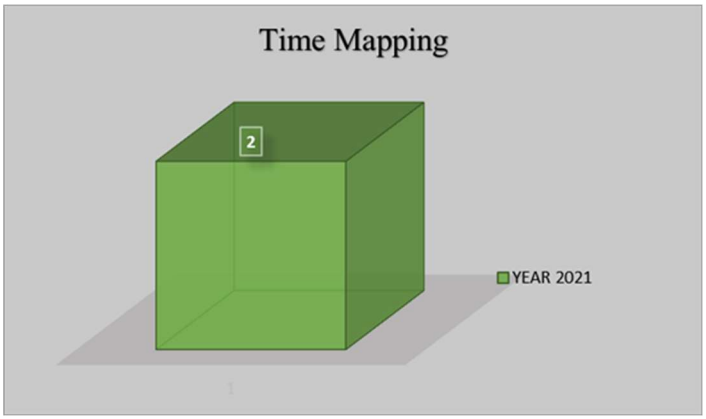
5 Results presentation and Discussion

Regarding the results, nationally (in Brazil), we emphasize, primarily, that, in accordance with joint attention and SLA, there were two (2) findings. Internationally (in other countries), we highlight that the findings consist of seventeen (17) works, amongst which only ten (10) combine all the scope of inclusion criteria. We projected a timeline, a time mapping of thematic investigation, as shown in '*national time mapping'* and '*international time mapping*' (graphs MT.I and MT.II, respectively), as follows, in order to show the amount of publications found, within the period of 2007-2018, in chronological order, worldwide (except Brazil), and during the year 2021, in Brazil.

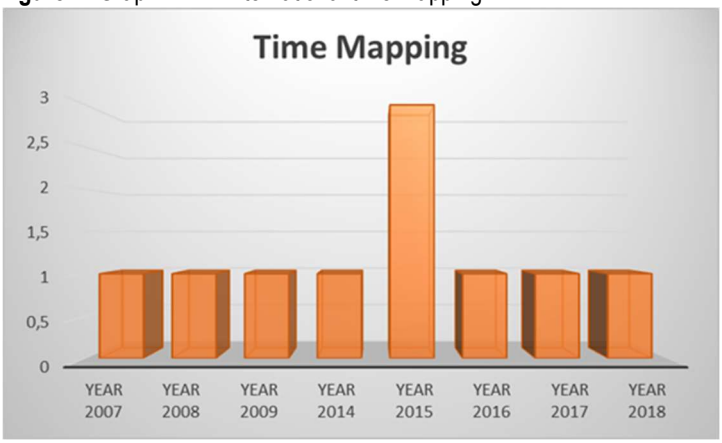
Figure 3: Graph MT.I: national time mapping



Source: the authors

The graph MT.I *'national time mapping"* (graph MT.I) demonstrates that 2021 was the year of publication of the two (2) Brazilian works obtained as findings during the bibliographic data collection carried out, which included one (1) dissertation and one (1) scientific paper. Information about the annual time interval of international findings and the period with a greater amount of published works are displayed in *'international time mapping"* (graph MT.II), as follows:

Figure 4: Graph MT.II: international time mapping



Fonte: os autores

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In *'international time mapping"* (graph MT.II), we observe that 2015 was the year with the greatest number of publications, with a total of 3 international works, including one (1) dissertation and two (2) articles.

Finally, we presented tables that represent data related to the publications found in Brazil and in other countries. Below, in '*national references in literature'* (table 1), we have compiled works identified in Brazil:

Table 1: national references in literature

Authors	Title	Main Objective
MOREIRA, F. M.	The role of interaction in second language acquisition/learning: a case study in a language school. UNESP, 2021. Masters Dissertation.	Observe and discuss the elements present in interaction and in the subject constitution under the dialogic -discursive perspective, discourse genre, joint attention and multimodality.
MOREIRA, F. M.; DEL RÉ, A.	A look at second language acquisition/learning in a language school: the role of genres, formats e multimodality. **Cadernos de Linguística**, 2021.	Understand the elements present in the child/teacher interaction and the acquisition/learning processes of a child, ESL learner.

Source: the authors

In relation to '*national references in literature'* (table 1), we will make a brief comment on each work. Either the dissertation by Moreira (2021) or the article by Moreira and Del Ré (2021) propose the understanding of multimodal resources in the teacher-child (English as a Second Language-ESL learner) interaction and their role in building the acquisition/learning process from a dialogic-discursive perspective, discourse genres, joint attention and multimodality. In both studies, in regards to the methodology, data of a 2-3 year-old child were collected, analyzed and transcribed from *CHAT* rules of *CLAN* program – *CHILDES* database. Results showed the elements that were present in the teacher-child interaction, which support the L2 acquisition/learning process. The multimodal elements anchor the interaction enabling the child to take place in discourse through them and the teacher to rest on them in order to interact in L2, sustaining joint attention and making the class happen.

Based on Brazilian findings, we observe that the studies refer to the speech-gesture production of a preschool child, who receives integral attention of the teacher while interacting in class, during the private lessons in an English language private course. The multimodal resources, specially vocal and gestural (hands and body), are used by the child and the teacher when

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promoting interaction in L2 and in joint attention focus. Both scientific works try to explain how SLA in children happens in a school setting and point out the routine established by the teacher in interaction and how this format provides structure to interaction, enabling the child to take a position in the dialogues, with role switching and evolution towards the consolidation of interaction during language practice. We have perceived that Moreira (2021) and Moreira and Del Ré (2021) point out the importance of the role of the 'other' to language acquisition and development by the child, when discussing about the interrelation of world and language knowledge surpassed by interaction between the 'I' and the 'other'.

We foresee that the content of what was elicited previously connects with considerations by Carpenter, Nagel and Tomasello (1998) about joint attention behaviors in 9 to 15-month-old babies and the emergent perception of the 'other' in these interactions. In that regard, Ávila-Nóbrega and Cavalcante (2012) highlight the multimodal resources used by two mother-baby dyads, in natural contexts; as well as Costa Filho and Cavalcante (2013), who approach the emergence and consolidation of linguistic reference in joint attention contexts. In relation to SLA in joint attention, specifically, we contemplate the works that were identified globally, with exception of Brazil, in eliciting the findings from the scientific literature on the theme, '*international references in literature'* (table 2), as follows:

Table 2: international references in literature

Author	Title	Main Objective
MCDONOUGH, K. *et al.*	Exploring the potential relationship between eye gaze and English L2 speakers' responses to recasts. Sage, 2015.	To Investigate if joint attention through eye-gaze predicts L2 speakers' responses to recast.
VOGT, P. *et al*.	Child-Robot Interactions for Second Language Tutoring to Preschool Children. Frontiers, 2017.	To create a digital learning environment, in which preschool children have individual interaction with a sociable robot that supports L2 learning.
KUNITZ, S.	Collaborative Attention Work on Gender Agreement in Italian as a Foreign Language, 2018.	To identify joint actions in Italian as L2 college students learners while collaboratively interacting.
MERKE, S.	Establishing the explainable in Finnish-as-a-foreign-language classroom interaction: Student-initiated explanation sequences. Learning, Culture and Social Interaction, 2016.	To analyze explanatory sequences initiated by students, in which they problematize linguistic issues by asking questions to the teacher.
ROSBOROUGH, A.	Gesture, meaning-making, and embodiment: Second language learning in an elementary classroom. Journal of Pedagogy, 2014.	To investigate the mediational role of gestures and body movements (placement) between a teacher and an

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		ESL learner in 4th grade of elementary school.
CONBOY, B. *et al*.	Social Interaction in Infants' Learning of Second-Language Phonetics: An Exploration of Brain-Behavior Relations. Developmental Neuropsychology, 2015.	To understand the role of social interaction in L2 learning.
KWISTHOUT, J. *et al*.	Joint attention and language evolution. Connection Science, 2008.	To investigate how more joint attention mechanisms, instead of only shared joint attention between two agents and an object, can be implemented and how they influence the results of linguistic games by these agents.
WU, L.	Understanding SLA through peer interactions in a Chinese classroom: A sociocultural perspective. 2009. Dissertations.	To examine the roles of peer interaction in a Chinese as L2 class; how different types of peer interaction affect L2 development; and what roles these interactions play in this context.
ELLIOT, K.	The Effects of Joint Attention Contexts on Adult Novel Word Learning. 2015	To examine if the initially perceived ideas and implicit attitudes of the joint attention partner would lead to a difference in linguistic learning.
ATKINSON, D. *et al*.	Alignment and Interaction in a Sociocognitive Approach to Second Language Acquisition. The Modern Language Journal, 2007.	To advocate the crucial role of alignment in SLA, as conceptualized from a broadly sociocognitive perspective.

Source: the authors

We conducted a brief report on the table '*international references in literature*' (table 2), above, where we observe a study by McDonough *et al*. (2015), in which methods encompass an exploratory study with ESL learners in performing communicative tasks with the research assistant, who gave them feedback in response to non-targeted forms. The interaction was recorded and the eyes movement was simultaneously monitored with the use of the *FaceLab* system. Study results showcased a logistics regression model that revealed that either the L2 speaker or the mutual eye-gaze of interactive partners foresaw target responses. The research work enquired if joint attention through eye-gaze could predict L2 speakers' responses to recasts. Results revealed that either the L2 speaker, during interaction with the research assistant, or the mutual eye-gaze of both would predict responses in the target language, highlighting that, like gestures, eye-gaze is a key component of the interaction and represents a way through which interlocutors establish joint attention in dialog.

Vogt *et al*. (2017) had a goal to specifically identify design characteristics to create a robot that could be sociable and friendly to children; and to investigate how children respond to different feedback forms given by a robot. The methodology included a robot that was introduced during

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'circle time', in the 3-year-old children's routine. The robot features refer to the ability to adapt to the linguistic proficiency level of each child, response unpredictability, temporal and semantically, joint attention establishment, meaningful gestures use, feedback provision and monitoring of the child's academic progress. Results indicated a list of design characteristics for tutor robots. According to the authors, research results offer a first sample towards a broader list of design characteristics for tutor robots that can be developed in future works.

In his work, Kunitz (2018) discusses L2 learners' joint actions in collaborative interaction and in the methodology, he brings the description of sequences focused on genres, which are initiated by mobilizing attention in shifts with which a student directs the coparticipants' attention to an oral or written item. Results show an attention respecification in social terms, like a bond of actions publicly displayed that are jointly achieved by college students.

Merke (2016) elicits in his research methods data collected from Finnish (L2) college lessons; the analysis focuses on sequences in which the participants engage in discussions to identify the specific linguistic problem, which should be considered as relevant and intersubjectively meaningful. Results clarified that the linguistic knowledge of students connects inherently to the interactive event and to the specific social context, what can be considered a learning practice that leads to specific and general expertise.

In a scientific investigation regarding gestures role in L2 learning, in a 4th grade elementary school classroom dyad, Rosborough (2014) pointed out, in the study methodology, gestures roles and body movements, as mediational tools, being analyzed from meaning production during the explanation of a math problem by a teacher to an ESL student. The analysis of the teacher-student dyad brings an insight on how they went from single responses exchange to the use of positions and gestures, embodied meanings and feelings, establishing, therefore, strategic ways to solve communication problems in the future. Results show that gestures and body positions, plus (inter)actions take on a central role in the dyadic experience of meaning construction, pointing to the interactive nature of the activity semiotic resources, whose speech and voice acts are bodily materialized.

Conboy *et al*. (2015), in their search for understanding the role of interaction in L2 learning, have created a methodology that encompasses joint attention scenes between adult, Spanish-speaking tutors, and babies (9-10 months), which were examined with the use of a neural measure of phonemic perception. Study results highlighted that the babies eye-gaze movements during the Spanish lessons when they were 9-10 months old, predicted language phonetic learning, when

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evaluated by a potent neural measures related to the event of discrimination of Spanish phonemes at the age of 11 months old. These findings refer to the relevant role of interactions, especially in infancy, in the acquisition of a new language.

Kwisthout *et al*. (2008) used a methodology that involves a computer simulation with language games, in composition with elements that simulate the three stages of joint attention identified in children's early development, and a measure of these agents' performance. Study results suggest that language and joint attention mechanisms evolution develop in a co-evolutionary way and that the evolutionary emergence of individual attentional mechanisms have the same ordering as that of the emergence of its development. Additionally, the sum of joint attention simulation elements substantially enhance the performance of the agents in these games.

Wu (2009), in his study methodology, exhibits data from personal background interviews, linguistic reflection diaries, audio and video recordings of Chinese as L2 learners, in pairs or groups, and oral proficiency interviews. Results collected showed that the findings support a sociocultural view of SLA; also show the benefits of assisted performance in peer interaction in L2; and help to broaden the understanding of the role of peer interaction in L2 and LE classrooms. Results have theoretical and practical implications either in teaching or in learning in an L2 classroom.

In the methodology conducted by Elliot (2015), there is a description of participants (19-24 years old) of Carleton University who were recruited by the '*SONA recruitment system*'. In addition, the experiment was divided in two sections: a learning phase and a testing phase. Independent measures of 'ANOVA' were used. The results presented from the experiment were not consistent with those of the prior experiments about joint attention; conclusions inferred from collected data indicate methodological limitations and gaps that could have impacted the project final result. In terms of limitations, according to the author, many fruitful avenues for future research in the field of joint attention studies remain prevalent.

Atkinson *et al*. (2007) carry out a discussion about the importance of alignment in SLA and, therefore, propose in their methodology procedures from and extended example of what they consider to be 'alignment in action', focusing on activities of a Japanese student and her tutor during English lessons in her sociocognitively built world. They verified other possible uses of the concept of alignment in research on L2 and teaching practice. As results, the authors validated the theory that alignment is a necessary tool and an essential requirement to L2 development.

From the previously enlightened point of view on alignment, we link the aforementioned considerations to premises by Tomasello and Todd (1983); Tomasello (1988) in explaining that joint

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attention refers to the shared focus of two individuals towards an object, whereas a joint attention episode refers to the joint alignment due to a clue provided by the interactive partner, who is the initiator of the interactive engagement, in joint attention circumstances, and whose actions are accompanied by one or more interlocutors in the scene. Authors reaffirm the essential nature of joint attention, properly referred by them as 'joint attention behaviors', particularly in early childhood, to language development. Moreover, given the scenario of bibliographical references that compose the *corpus* collection, we accentuate the strong link of the theoretical assumptions that integrate the findings with what is stated by Stam (2014), McNeill's follower and advocate for the inclusion of gesture studies in SLA and language education, when validating the indissociability of speech-gesture aspects in the language multimodal processing.

From this perspective, the compilation of results of the identified works points to the importance and the crucial role of social interaction to L2 learning, with joint attention being the catalytic circumstance in the process of linguistic development. In accordance with Atkinson *et al*. (2007), alignment of attention is an essential requirement for L2 development. This way, when deepening the crossing of collected information, we verify that social contact, in joint interactions, promotes the emergence, development and potentiation of language acquisition.

Specifically, regarding SLA, studies show different contributions; for example, research results by McDonough (2015) revealed that L2 speakers and speaker-tutors and learners' mutual eye-gaze predicted answers in the target language during interactions. We observed that the elucidated assumptions, despite bringing adult individual's data, link with premises by Todisco *et al.* (2021), regarding eye-gaze, when highlighting that children communicate through speech, gestures and eye-gaze, as they are synchronically multimodal. Our understanding is that either adults or children use multimodal resources in interactive circumstances. Furthermore, under the perspective by Novack e Goldin-Meadow (2015), learning through gestures is a generalized phenomenon throughout life; thus, not restricted to a single age range. Besides, in interactive contexts, Kontogiorgos *et al.* (2018) found out that, while investigating different types of eye-gaze, researchers could advance more in studies about multimodal and multiparty behaviors of shift changing with the other, as the studies about eye-gaze would serve as a foundation for the latter.

In investigative study carried out by Vogt *et al*. (2017), results indicated a list of design characteristics for tutor robots, which also referred to the use of gestures in the composition of joint attention episodes. In this regard, we link the explained content to statements by Cavalcante (2018), Fonte (2011, 2014) and Barros and Fonte (2016), whose studies stress gestures role in

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language acquisition by the child, when supposing that the child is inserted in the language by a prosodic-gestural framework.

The work by Kunitz (2018) brings the notion of L2 learners' joint actions while in collaborative interaction, with results that contemplate the respecification of joint attention in social terms. Merke (2016), in turn, discusses the engagement of participants in the identification of a linguistic problem, indicating that learners' linguistic knowledge connects to interaction and to the specific social context, becoming a learning practice. We build a bridge between the above mentioned research and joint attention studies carried out by Ávila-Nóbrega (2017), which elicit children as attentional beings, when interacting multimodally in joint engagement collaborative situations; and studies by Melo (2015), in predicting that the emergence of spontaneous actions and the emergence of multimodal behaviors and movements are due to the fact that language itself is dynamic and multimodal; the author presents the '*redirected joint attention'* and the '*collective/collaborative joint attention'*, where there are, in the latter, the collaboration of the child in regards to the establishment of a triadic relation composed by one or two adults and one child and/or their peers.

Rosborough (2014) elicits gestures roles and body position, as mediational tools in grasping meaning in SLA. Subsequently, we link the elucidated statements with the issues addressed by Goldin-Meadow and Alibali (2013), when validating the importance of gestures, especially in language acquisition by the child, with remarks on their role as an access road to cognition and reflection of speakers' thoughts, besides their benefits to language comprehension and construction.

Conboy *et al*. (2015) deal with the babies eye-gaze movements and the role that eye-gaze take on interactions. We seek to establish a dialog between what is stated by the referred authors and what is proposed by Tomasello (2019), when he outlines the emergence of joint attention behaviors in 9-month-old babies, who become aware of the other, with which they are able to form triadic interactions. Accordingly, Kwisthout *et al*. (2008) addressed three stages of joint attention (check attention, follow attention and direct attention) identified in children with early development. According to Tomasello (2019), in social interaction, the mutual focus of attention towards an object or event can be followed, directed or shared. In the research by Carpenter, Nagel e Tomasello (1998), the three joint attention stages mentioned reveal joint attention behaviors observed in babies as of 9 months old.

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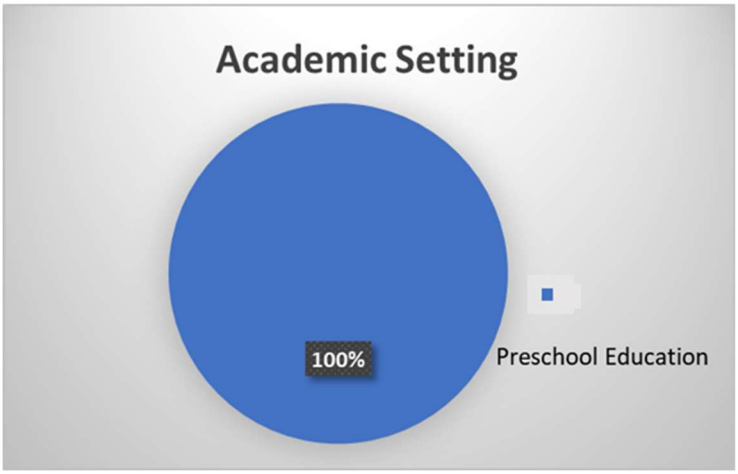
Through research results, after examining peer to peer interactions, Wu (2009) elicits the understanding of the role of peer interaction in L2 and LE acquisition, besides revealing the advantages in performance assisted by peers during interaction. In this study, findings support a sociocultural view of SLA. In relation to the above mentioned statement, Moraes (2018) elicits, in his research work, the importance of peer-to-peer social interaction for a more effective language learning.

Moreover, in order to establish a connection with our findings, from current research results, we recruited Elliot (2015), whose study, aside from composing the analyzed *corpus*, guides us to a fertile ground for new research in the field of joint attention and SLA knowledge.

As indicated in the methodology section, after data collection in the databases, between 2002 and 2023, aiming to find references in the area, we synthesize the information, refined data via flowcharts and, as follows, displayed data of each topic elicited in the objectives, quantitatively, in graphs, order from 1 to 4 (findings from Brazil) and from de 5 to 8 (findings from abroad):

Graph 1: Privileged Context



Source: the authors

Graph 1 illustrates data related to the academic context addressed in the two only scientific productions found in Brazil; in both cases, the research setting was a language course classroom, with one (1) preschool child. Thereafter, we see graph 2 with data about the age range reported in the studies from Brazil:

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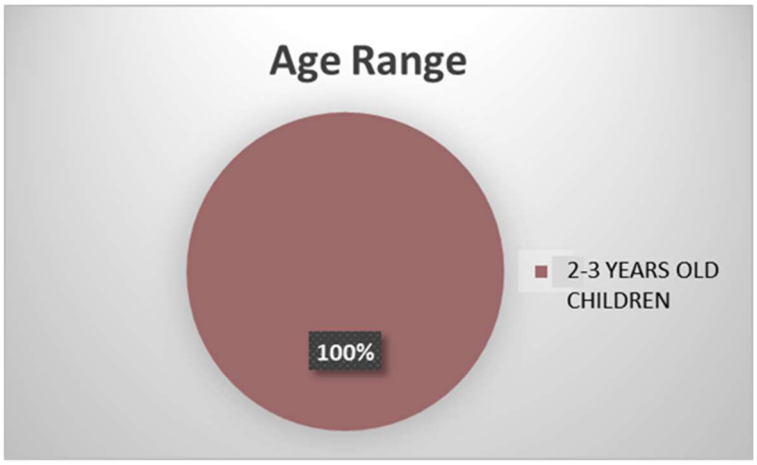
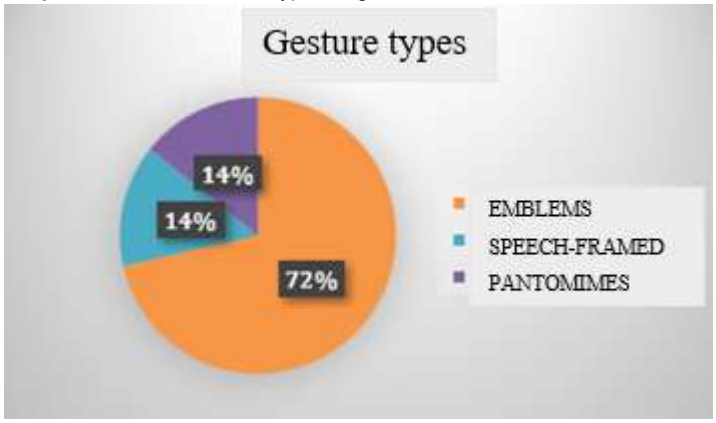
Graph 2: age range



Source: the authors

Graph 2 exhibits information about the age range studied in the findings from Brazil, which comprise the interval between 2 to 3 years old. As follows, we observe graph 3 with data about gestures types that were most recurrent in the findings from Brazil:

Graph 3: The most studied types of gestures



Source: the authors

In graph 3, we observe information related to the most found types of gestures in publications from Brazil, with a greater proportion of emblems, among which we highlight the pointing deictic gestures, considering their relevance in joint attention episodes, as pointed out by Costa Filho (2017); head movements up and down and to the sides, representing 'yes' and 'no', respectively; finger movements to the sides indicating negation; waving; blowing kisses, etc. Regarding the pantomimes and the speech-framed gestures, they present an equivalent percentage in the studies, with the occurrence of one speech-framed gesture of iconic dimension. The publications study objects were gestures, interaction and SLA. Subsequently, we see graph 4

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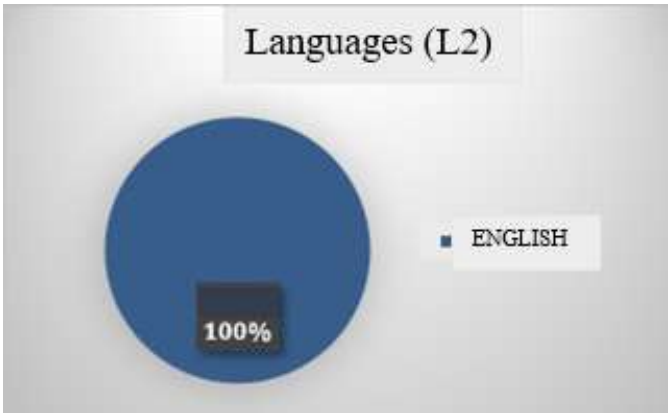
with data about the most recurrent and referred to as L2 languages in Brazilian studies identified as findings

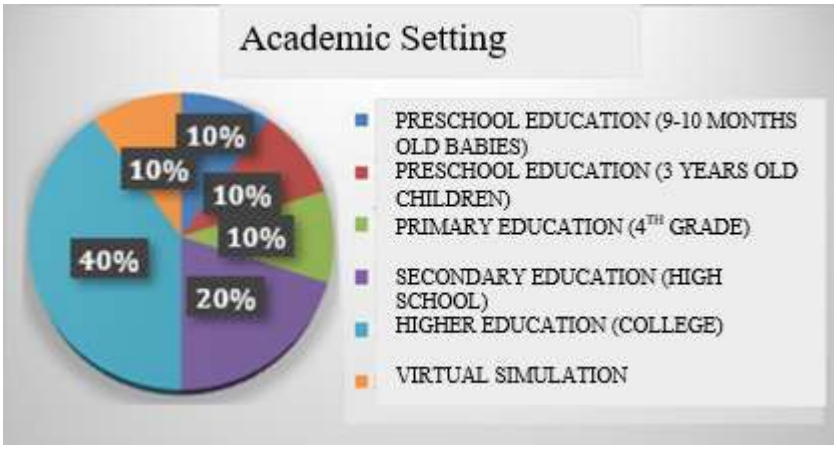
Graph 4: Most recurrent and referred to as L2 languages



Source: the authors

In graph 4, we verified that the English language was the only language referred to as L2 in the two (2) findings that were analyzed from Brazil. We proceed to the presentation of international findings, that is, findings in the global sphere, except Brazil, depicting percentile data of each topic proposed in the research objectives, in graphs, from 5 to 8, in ascending order:

Graph 5: privileged contexts



Source: the authors

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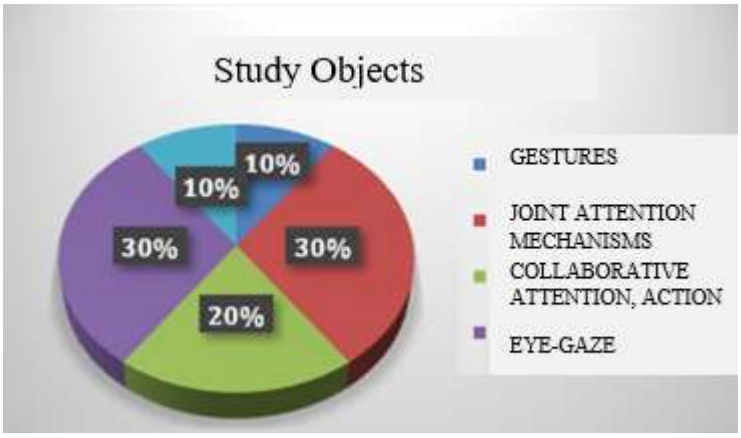
In graph 5, related to the privileged contexts in Brazil, we have identified the academic contexts in which research was conducted. Mainly, there was a greater proportion of undergraduate higher education settings, and the investigations were carried out in classrooms or at university labs, what we confirm in research by McDonough *et al*. (2015); Kunitz (2018); Elliot (2015); Merke (2016). Afterwards, the settings are: high school setting, with one (1) work by de Wu (2009) and one (1) study by Atkinson *et al*. (2007); elementary school setting (4th grade), with one (1) publication by Rosborough (2014); preschool education setting, with one (1) work by Vogt *et al*. (2017) and another by Conboy *et al*. (2015); and also one (1) work by Kwisthout *et al* (2008), whose research setting is a virtual world, where computer simulations are carried out in an agent based model. In sum, there are four (4) studies that take place in universities (classrooms or labs), two (2) in high school and four (4) studies, each of them in a different setting.

What follows is graph 6, which brings information about the most addressed study objects in publications from around the globe, except Brazil, within the theme scope in the field of interest for our research:

Graph 6: study objects



Source: the authors

As can be observed in graph 6, we infer that, among the most addressed study objects in the analyzed publications, there are the joint attention mechanisms and their role in SLA, as seen in Vogt et al. (2017), Kwisthout *et al*. (2008) and Merke (2016); as well as, the eye-gaze and its monitoring during interactions, i.e. one (1) research work by Elliot (2015), one (1) by McDonough *et al*. (2015) and another by Conboy *et al*. (2015). In decreasing percentages, we identifies one (1) study by Rosborough (2014), in which gestures are the object; also one (1) study by Kunitz (2018) and one (1) by Wu (2009), whose focus object are students collaborative attention and actions,

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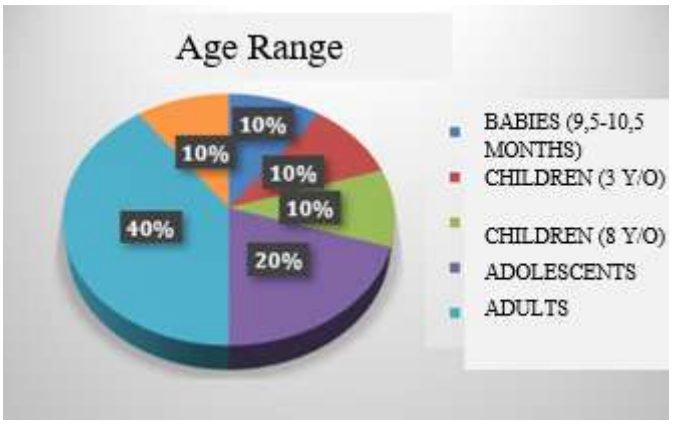
plus one (1) study by Atkinson *et al*. (2007) that indicated alignment as an essential tool for L2 development. In regards to research by Elliot (2015) about explicit communicative gestures, including visual contact and gaze shifting as non-verbal communicative gestures and the acquisition of a pseudo L2 in interaction, we observe that the major occurrence is of deictic gestures, also referred to as the 'index finger pointing' and/or 'deictic touch'. Moreover, in allusion to the work by Elliot (2015), we have identified other gestural configurations, including beats, metaphoric and iconic gestures. In that regard, according to considerations by Costa Filho (2016) on joint attention, pointing is crucial to the constitution of the triadic relation, as it is eye-gaze, that accompanies it in interaction, fact that would explain the most accentuated amount of this type of gestural configuration in this specific work on the theme.

In graph 7, we observe the division of the most prioritized age groups in the studies, as follows:

Graph 7: age range



Source: the authors

Considering data elicited from the graph entitled '*age range*' (graph 7), we realize that the age group of adults, college participants and/or L2 learners, was the most studied within the analyzed *corpus*. It is worth mentioning that, in contrast to the joint attention and mother tongue (L1) acquisition studies, with prevalence in babies or young children, as in research by Cavalcante (2018), Fonte (2011, 2014) and Barros and Fonte (2016), results of data collection, which are now proposed, show that the link between theoretical constructs related to joint attention and SLA, in worldwide studies, except Brazil, mainly contemplates adult participants. These findings call attention for their connection to the age range privileged by Kendon (2004) e McNeill (1985, 2006), in their investigative studies with adult individuals.

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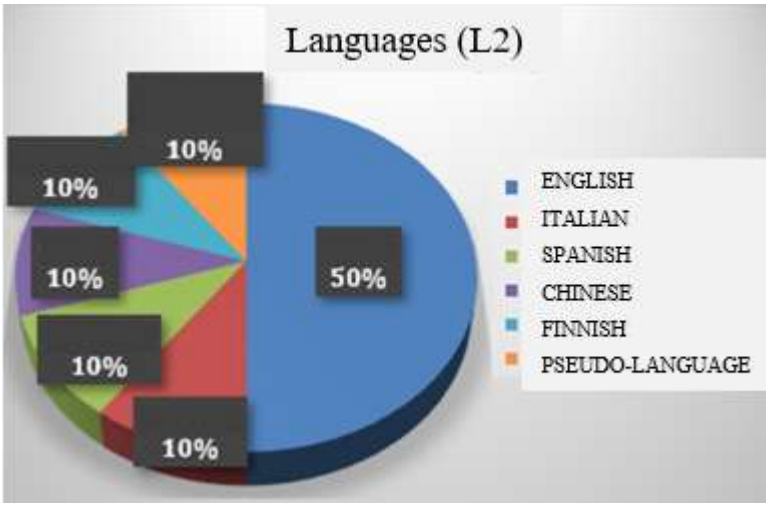
The next graph brings information about the most addressed and referred to as L2 languages in the elicited research, as follows:

Graph 8: most recurrent and referred to as L2 languages



Source: the authors

In terms of SLA studies in joint attention contexts, we notice in graph 8 that among the languages referred to as L2, English is the one, predominantly, covering 50% of the studies; then, comes Italian, Finnish, Chinese, Spanish and a Pseudo language (L2), which were addressed each of them in a different study within the theme.

Concerning the results in Brazil, we emphasize two (2) findings that favored preschool education settings, with published works in 2021. Globally (except Brazil), we observe the prevalence of contexts including college participants, with the greatest amount of publications in 2015, within the annual period from 2007 to 2017, which is related to data collected in the specific global segment. We consider that, although there are relevant scientific findings linked to the particular theme – joint attention and SLA, worldwide, the amount of publications is minimal, especially in considering a time length of more than twenty (20) years. Amongst the analyzed works, an L2 finding that calls our attention is the variety of four languages explored in the studies, with predominance of English, as previously mentioned.

From the broad scientific disclosure of findings we reaffirm the importance of joint attention and multimodal SLA studies. We understand that searching for reference data in the national and international scientific literature on the specific topics of 'joint attention' and 'SLA' would cover, in

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its core, elements related to the multimodal language processing, a confirmed fact, which justifies the non-inclusion of the descriptor term 'multimodality' in the web searching platforms.

Closing Remarks

From the research objectives achievement, which consisted in investigating data related to national and international publications on SLA and joint attention, we have identified privileged contexts, recognizing the gestures with the greatest occurrence or the characteristic and particular study objects of each study within the scope of the common object to all – SLA and joint attention. Additionally, we have verified the prioritized age group and the most studied language.

Therefore, in what refers to the scientific literature in Brazil, we have obtained results that illustrate: the preschool classroom as the identified setting; the ages 2-3 years old as the verified age range; deictic gestures as the most recognized; and English as the most frequent and referred to as L2 language, in the analyzed works. Regarding the international scientific literature, disclosed findings signal the following indicators: higher education as the favored identified setting; adulthood as the prevalent age range; joint attention mechanisms and their role in SLA as the predominant study object; and English as the prominent language, with a 50% occurrence, in the analyzed research works.

In sum, we have perceived minimal quantity of publications, reflected in non-expressive data within the SLA domain from joint attention contexts. Regarding the results, we have elicited that, nationally, there were two (2) findings published in 2021; while, internationally, we have identified ten (10) studies from 2007 to 2017, and 2015 as the year with the greatest number of published works.

Presented data provided relevant information about the publications scenario in the scientific literature in reference to the realms of SLA and joint attention knowledge crossing, and revealed the *status quo* of scientific works in the national sphere, fostering the emergence of possible insights and outlining our paths for the production of new research, in the respective fields of knowledge. Based on analyzed and discussed data, we validate the scientific contribution of the study, as data were carefully described, detailed, analyzed, categorized and accounted for, within a considerable time period, over the course of twenty one years.

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We confirm the strength and the relevance of joint attention in multimodal SLA studies, as well as we anticipate a promising horizon for investigative ventures in the referred areas of knowledge. Last, but not least, it is worth noting that the value of the findings goes beyond the borders of our investigation and its contribution, even being modest, leads to the further development of studies on multimodality in SLA from joint attention contexts, enriching the areas of language acquisition, Education and Applied Linguistics.

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