**Original Article**

OPEN ACCESS

Revista Educação e Linguagens

Revista dos cursos de Pedagogia e de Letras da Universidade Estadual do Paraná
Unespar / Campus de Campo Mourão

Vol.16, e162607, 2026

Submitted em: 25/08/2025 Accepted em: 21/01/2026 Published: 06/02/2026

# Perceptions about babies: a comparative analysis using photographs in the evaluation of training processes

## Percepções sobre os bebês: uma análise comparativa com uso de fotografias na avaliação de processos formativos

## Percepciones sobre los bebés: un análisis comparativo con el uso de fotografías en la evaluación de procesos formativos

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**Abstract:** This paper presents a proposal for an instrument to evaluate formative training processes, aimed at professionals who work with babies. It is a study using a mixed approach (qualitative and quantitative), quasi-experimental before-and-after study. The instrument consisted of showing pairs of photographs of the same baby, in similar situations, although with different facial expressions, before and after the training. The participants were invited to choose one image from each pair and support their choice through an open question from a Google form. 12 pairs of photographs were used, and the average time between the pre and post test was 48 hours. The answers were submitted to a content analysis, with an additional word cloud created to go along the qualitative assessment. The research involved 247 professionals of the Public Service, in three different contexts: 107 professionals working in Brazil (Context 1) and 140 early childhood professionals from the health and education fields working in France, Belgium, and Luxembourg: BabyLab Cerep Phymentin Conference – Paris, France (Context 2) and the WAIMH International Colloquium (Context 3). The results reveal changes in participants' perceptual criteria following the training, with the incorporation of more technical and conceptual references in the justifications provided. These findings indicate the potential

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of photography as a sensitive and effective resource for evaluating learning and the effects of training processes in the field of early childhood.
**Keywords**: babies; photography; professional training; visual anthropology.

**Resumo:** Este artigo apresenta uma proposta de instrumento para a avaliação de processos formativos dirigidos a profissionais que atuam com bebês. Trata-se de um estudo de abordagem mista (qualitativa e quantitativa), quase-experimental, do tipo antes-depois. O instrumento consistiu na apresentação de pares de fotografias de um mesmo bebê em situações semelhantes. Antes e depois da capacitação, os participantes foram convidados a escolher uma imagem de cada par e justificar a escolha, por meio de uma questão aberta, aplicada via formulário Google Forms. Foram utilizados 12 pares de fotos, com o intervalo médio de 48 horas entre o pré-teste e o pós-teste. As respostas foram submetidas à análise de conteúdo, sendo a avaliação qualitativa complementada por uma nuvem de palavras. A pesquisa envolveu 247 profissionais do Serviço Público em três contextos distintos: 107 profissionais atuantes no Brasil (Contexto 1) e 140 profissionais da primeira infância, das áreas da saúde e da educação, atuantes na França, Bélgica e Luxemburgo: Jornada do *BabyLab Cerep Phymentin* – Paris, França (Contexto 2) e no Colóquio internacional da WAIMH (*World Association of Infant Mental Health* ) – (Contexto 3). Os resultados evidenciaram transformações nos critérios de percepção dos participantes após a formação, com a incorporação de referências mais técnicas e conceituais nas justificativas apresentadas. Esses achados indicam o potencial da fotografia como recurso sensível e eficaz para a avaliação da aprendizagem e dos efeitos de processos formativos no campo da primeira infância.
**Palavras-chave:** bebês; fotografia; capacitação profissional; antropologia visual.

**Resumen:** Este artículo presenta una propuesta de un instrumento para la evaluación de procesos formativos dirigidos a profesionales que actúan con bebés. Se trata de un estudio de abordaje mixta (cualitativa y cuantitativa), casi experimental, del tipo antes y después. El instrumento consistió en la presentación de pares de fotografías de un mismo bebé en situaciones semejantes, pero con diferentes expresiones faciales. Antes y después de la capacitación los participantes fueron invitados a elegir una imagen de cada par y justificar su elección por medio de una pregunta abierta, aplicada por un formulario Google Forms. Fueron utilizados 12 pares de fotografías con un intervalo medio entre los dos, pre y post test, de 48 horas. Las respuestas fueron sometidas al análisis del contenido siendo la evaluación cualitativa complementada con una nube de palabras. La encuesta involucró a 247 profesionales del servicio público en tres ámbitos diferentes: 107 profesionales que trabajan en Brasil (ambito1) y 140 profesionales de la primera infancia de los campos de la salud y la educación en Francia, Bélgica y Luxemburgo: Conferencia *BabyLab Cerep Phymentin* – París, Francia (âmbito 2) y el Coloquio Internacional WAIMH (âmbito 3 ).Los resultados demuestran transformaciones en los criterios de percepción de los participantes después de la formación, con inclusión de referencias más técnicas y conceptuales en las justificaciones expuestas. Esos hallazgos indican el potencial de la fotografía como recurso sensible y eficaz para la evaluación del aprendizaje y de los efectos de procesos formativos en el campo de la primera infancia.
**Palabras claves:** bebés. fotografia; capacitación professional; antropología visual.

# 1. Introduction

For a long time, babies were described and defined primarily based on what were believed to be frailties, disabilities, and immaturity. It was a widespread idea that soon after birth, the baby would go through a phase during which it would remain fused with the mother and would not yet recognize itself as a separate being. Even after the first few months of life, the baby is still frequently considered a passive being who lacks language and only reacts to stimuli. Although outdated by current scientific evidence, this concept is still widely disseminated as the truth.

However, the most recent and advanced research points to the need to revise these ideas. As Parlato-Oliveira (2024, p. 94) states, “the baby revealed in the research is an agent of knowledge; it intentionally seeks information, analyzes it and uses it to build new forms of interaction with different interpretive strategies.” This recognition transforms the way we look at

babies, redefining our expectations towards them, towards the way we relate to their presence and towards the ways they express their language.

To consider that babies are already endowed with language implies recognizing that it is necessary to listen to their unique expressions. However, all these findings are still far from being widely known in the everyday contexts of infant care, such as daycare centers, healthcare institutions and within families. A baby's multimodal language is composed of different modes of expression, such as gaze, gesture, body tone, posture, vocalizations, rhythm, and prosody. Therefore, even before speech, the baby already displays language and expresses it in its interactions with others.

As Parlato-Oliveira (2019; 2024; 2025) states, recognizing the multimodal language of the baby is fundamental for early childhood professionals, as it allows them to listen to the baby beyond the verbal, as well as to welcome communicative initiatives and support active participation in affective, educational and cultural exchanges. This is a clinical and ethical knowledge that implies considering the baby a subject right from the beginning, a subject who is capable of expressing itself and of interacting with the world that summons it.

What are the concepts that guide the practices of professionals who work with babies? Is it possible to change this perception about babies through professional training? These issues constantly permeate studies on the role of those who care for babies.

Research on early childhood points to a lack of pedagogical foundations for this age group (Buss-Simão; Rocha; Gonçalves, 2015; Fleer; Veresov, 2018; Ge; Wang; Liu, 2021; Ragni *et al*., 2021; Freitas; Libâneo, 2022; Abreu, 2023). Furthermore, certain practices observed in daycare centers often lack pedagogical intent grounded in scientific knowledge. The work of Albuquerque and Aquino (2021) highlights the importance of continuous training and suggests considering child development and the interactions between educator, child and environment as a means to strengthen interactive processes.

Coutinho's study (2002, p. 71) is particularly illuminating, pointing out the "(mis)encounter of two ways of being: that of children, which is dynamic, diverse and vibrant, and that of the institution and, at times, of adults, which is routine, homogeneous and ritualized". This begs a reflection on how to structure work with young children in a way that respects and flows with the rhythms, actions, and needs of those involved-babies and professionals alike. According to the author, before an adult can propose meaningful educational experiences, they must develop an attentive and sensitive perspective in tune with the people for whom the proposal is intended and with its purposes (Coutinho, 2002).

It is crucial to recognize that professionals who work with this age group need to be attentive to the diverse expressions and needs that continually emerge from the babies under their care. Crying, hunger, sleepiness, feeling cold, feeling hot — all of these manifestations occur uniquely for each baby and require attentive and sensitive listening. What knowledge, then, underpins the daily practices of these professionals?

The training and development of Primary Health Care (PHC) professionals are fundamental to building a comprehensive and transformational care model in Family Health. The qualification of professionals should go beyond the transmission of technical knowledge, incorporating pedagogical practices that promote critical reflection, interdisciplinarity, and the valuing of users' experience.

In light of this, the Family Health Strategy (FHS) proves to be an effective model for expanding access to health services and promoting care that is more closely aligned with the population's needs. However, effectiveness depends directly on qualified teams, as these professionals are the ones who ensure that PHC solves people's problems and that there will be a continuous follow-up in care.

Training based on active methodologies, such as Problem-Based Learning (PBL), and the emphasis on continuing education are essential to empower professionals in dealing with the complexities of public health practice. It is essential that professionals be prepared to work collaboratively, in order to recognize the social determinants of health and promote inclusive and equitable practices.

The engagement of healthcare professionals in building user- and community-centered care depends on training that goes beyond reductionist biomedicine, and incorporates elements of communication, active listening and humanization of care. Hence, it is essential to rely on instruments that are capable of evaluating how these training programs impact the perspective and perceptual criteria of professionals working with babies, especially in recognizing their multimodal language.

This paper proposes a reflection on the importance of continuous training in developing a more attentive and grounded perspective for dealing with such specificities. To contribute to this reflection, the present study presents a method for evaluating the effects of these training programs, based on a comparison between choices made by professionals when presented with pairs of photographs of the same baby before and after the training.

Thus, this study aims to evaluate the effects of training programs on how early childhood professionals perceive and interpret the multimodal language of babies. To this end, the study seeks to compare the choices made between pairs of photos before and after the training, to qualitatively analyze the words and expressions used by the participants to justify their choices, to understand the criteria used in the selection process, and to identify possible changes in the modes of perception and recognition of the baby's multimodal language.

## 2 Methodology

This section of the article addresses methodological issues and is divided into five topics. It discusses the type of research, photography as an analytical tool, the data collection

procedure, the participants, and the analysis procedures, which are divided into quantitative and qualitative analysis.

## 2.1 Type of research

This study is a mixed-methods, exploratory research project with a qualitative-quantitative approach, focused on evaluating the impact of a training program on infant knowledge, conducted with professionals who work with babies.

## 2.2 Photography as an Instrument of Analysis

Through the selection of photographic images of babies, we seek to understand how professionals interpret the multimodal language of the baby. The choice between two seemingly similar photos can reveal more than just an aesthetic preference: it points to complex mental activity involving the interpretation of affective, sensory, and relational clues.

In this context, photography becomes a significant tool for comparing the effect of professional training programs. A captured moment can represent a wide range of information — both about the baby and about how it is perceived by the adult. As Harazim (2016) points out, the good choice of a moment can contribute a great deal, as it condenses meanings that escape the continuous flow of lived time.

The analysis of these photographs is therefore situated within the field of visual anthropology, which encompasses images not as neutral records, but as dialogical productions. As stated by Mammi and Schwarcz (2008, p. 113), photography “ plants questions in the contradictions it contains,” and its interpretation can go beyond the photographer's original intention, as it produces new meanings based on the observer's experience.

Neiva-Silva and Koller (2002) identify four main functions of photography in psychological research: recording, modeling, feedback, and self-photography. According to the authors, images can access emotional and subjective aspects that ultimately escape verbal language. In an increasingly post-literate society, as discussed by Phillips, O'Neill, and Osmond (2007), visual representations are gaining more and more strength as legitimate forms of memory and reflection.

The pairs of photographs used in this study were selected in order to maintain constant aspects, such as framing, context, and visual conditions, and to vary primarily the multimodal language of the baby. The methodological choice was made to compare the perceptual criteria used by the participants, in order to reduce the interference of external elements.

The instrument used in this study — an online form with pairs of photos of the same baby — makes it possible to assess changes in professionals' perceptions after professional training.

The choice between the photos, along with a written justification, reveals the subjective criteria used by the participants and provides material for quantitative and qualitative analysis. Thus, photography combined with the "before/after training" comparative methodology, becomes a tool to verify the transformations in the professional's perspective on babies.

## 2.3 Data collection procedure

The project was approved by the Research Ethics Committee of FAMINAS on December 1, 2024, under decision number 6.545.556 and CAAE number 75933423.7.0000.5105, conducted in accordance with the ethical and legal precepts governing research with human beings. The photographs used as a research tool come from a previously published work, in which the babies are anonymized from the outset, without any information that could identify them.

The images in this study were used exclusively for academic and scientific purposes, and suffered no alteration in their original content. The principles of confidentiality, image protection and preservation of the dignity of the subjects portrayed were followed. The photos were presented before and after the training, allowing for the identification of changes in choices and criteria, thus enabling the evaluation of the training's effect on recognizing babies' expressions.

The data collection instrument used in this study consisted of an online form developed on *Google Forms*. During the training sessions, a QR code was displayed on a screen so that participants were able to scan and access the form using their own cell phones. Next, pairs of images were projected: each pair with two photographs of the same baby, captured at slightly different moments, in order to reveal different expressions.

Each pair of images was projected for 10 seconds. The images used are part of Maya Gratier's collection, featured in the book by Gratier, Simeoni and Lumbruso (2022). In total, 12 pairs of photos were displayed. Participants selected their preferred image (image 1 or image 2) on the form, providing justification at the end of the procedure through spontaneous writing. The form was administered at two points in time: before and after the training sessions.

## 2.4 Participants

The research involved a total of 247 professionals, divided into three distinct groups for the application of the instrument, between August 2023 and June 2025 (Table 1).

Group 1: Training on infant knowledge for professionals of the Unified Health System (SUS) in the city of Pará de Minas – Minas Gerais, Brazil. This group included 107 professionals from the health, social assistance and education sectors. The training took place in August 2023. The average age of the participants was 43 years. A diversity of professional backgrounds was observed, with a predominance of health and psychology professionals: 31 nurses, 19

psychologists, 15 doctors, 8 physiotherapists, 6 speech therapists, 3 social workers, 2 educators, and 2 educational psychologists. 32.6% of participants had less than 5 years of professional experience working with babies, 22.1% had between 5 and 10 years, 18.6% between 10 and 15 years, and 25.6% had more than 15 years.

Group 2: *BabyLab Cerep Phymentin* Journey – Paris, France. The training took place in November 2024. Fifty-one early childhood professionals participated, from the health and education sectors: 27 psychologists, 10 educators, 3 nurses, 2 childcare assistants, 2 childcare workers, 1 physician, 1 specialized educator, 1 psychomotor therapist, 1 social worker, 1 occupational therapist, and 2 researchers in child development. The average age of the participants was 43.9 years. 53.7% had more than 15 years of professional experience working with babies, 20.4% had less than 5 years, 16.7% had between 10 and 15 years, and 9.3% had between 5 and 10 years.

Group 3: International Colloquium of the WAIMH (*World Association of Infant Mental Health*) - France – Paris, France. The training took place in June 2024. Eighty-nine professionals from France, Belgium, and Luxembourg participated: 45 psychologists, 3 psychoanalysts, 6 child psychiatrists, 2 doctors, 2 nurses, 2 psychomotor therapists, 2 educators, 3 social workers, 3 students, 1 occupational therapist, 1 researcher in child development, 1 early childhood educator, 1 university professor, 1 early childhood education teacher, 1 early childhood consultant, 1 director of a child care institution, 1 pedagogical coordinator, 1 clinical supervisor, 1 neuropsychologist, 1 educational psychologist, 1 anthropologist, 1 sociologist, 1 social educator, 1 specialist in public policies for childhood, 1 technician in child development, 1 institutional child care worker, 1 person responsible for continuing education, 1 researcher in mental health, 1 coordinator of services for childhood. The average age of the participants was 41.4 years. 60.5% of participants had more than 15 years of professional experience working with babies, 25.6% had less than 5 years, 10.5% had between 10 and 15 years, and 3.5% had between 5 and 10 years.

**Table 1 –** Sample characterization

| Group | N | Workload | Date of event | Nationality | Training provider(s) |
|---|---|---|---|---|---|
| 1 | 107 | 16 hours | August 2023 | Brazilians | Erika Parlato-Oliveira |
| 2 | 51 | 6h | November 2024 | French | Erika Parlato-Oliveira and Maya Gratier |
| 3 | 89 | 6h | June 2025 | French, Belgian and Luxembourgish | Erika Parlato-Oliveira and Maya Gratier |

Source: Prepared by the authors (2026).

The inclusion criteria were to have fully participated in the training offered and to have responded to the evaluation instrument before and after the training. No exclusion criteria were applied other than non-participation in both stages of evaluation. In each of the three applications, at least one

of the same researcher was present. Regarding the facilitators, there was also one facilitator in each of the training sessions, and a second facilitator in two of them.

## 2.5 Analysis Procedures

Analysis of the collected data was carried out in both quantitative and qualitative ways, allowing for an understanding of the variations in choices and the criteria described by the participants.

### 2.5.1 Quantitative analysis

The percentages of choices between images 1 and 2 were calculated for each pair of photographs.

The responses were organized by group (before and after the training) to allow for a direct comparison between the two periods.

- To assess whether there was a significant change in the direction of the responses between the two time points, the McNemar test, appropriate for paired dichotomous categorical data, was used. The test considers only discordant pairs (1 → 2 and 2 → 1), testing the null hypothesis of equal frequencies between the two directions of change. Given the relatively small size of some samples ($n < 25$ discrepancies), McNemar's exact test (binomial) was preferred over the chi-square approximation, ensuring greater robustness in the results. For each image, the absolute number of changes, the percentage of participants who changed their response, and the corresponding p-value were reported. The significance level adopted was 5% ($p < 0.05$). All analyses were performed in Python (statsmodels package), with the results organized into summary tables to facilitate interpretation.

The results were presented in split bar graphs, which show the percentage distribution of participants' preferences for each image in each pair of images. In group 1, a quantitative analysis was also performed using the JAMOVI application, a *software* with a vast collection of integrated statistical techniques, including variance analysis (ANOVA), linear regression, hypothesis testing, and multivariate models, as well as data visualization and data editing features. Developed jointly by researchers from the University of Amsterdam and the University of Ghent, Jamovi was created to be an accessible and simplified alternative to more complex and advanced statistical analysis programs. Jamovi also supports the installation of additional modules to extend its functionalities, as it is a free and open-source software for statistical data analysis. It also offers a user-friendly graphical interface. The quantitative results were interpreted in conjunction with the qualitative analysis of the written justifications. This allowed for an understanding not only of the occurrence of changes in choices, but also of the criteria used by participants in these decisions.

### 2.5.2 Qualitative analysis

The qualitative analysis was conducted aiming to deepen the understanding of the changes observed in the choices made by the participants before and after the training. The justifications written by the participants were subjected to content analysis and treated as textual units of analysis. First, a cursory reading of the entire set of responses was conducted, aiming to identify lexical, thematic and semantic recurrences. Based on this reading, core meanings were identified, which guided the interpretation of the criteria used by the participants in choosing the images.

Next, an interpretative reading of the statements was made, in order to understand the transformations in the elements considered significant before and after the training. Frequency analysis of terms and the creation of word clouds were used as complementary visualization tools, assisting in the identification of recurring terms in both application phases of the instrument, without replacing contextualized qualitative analysis.

## 3 Results

Statistical analyses were conducted, considering the pre- and post-intervention design with repeated measures on the same participants. Each pair of images (n=12) was presented twice: before and after the training. At each point, participants chose between two possible answer options.

The comparison of answers before and after the training was carried out using 2x2 contingency tables, accounting for: a) participants who maintained their choice (1 → 1 or 2 → 2) and b) participants who changed their option (1 → 2 or 2 → 1).

To assess whether there was a significant change in the direction of the responses between the two time points, the McNemar test, appropriate for paired dichotomous categorical data, was used. The test considers only the discordant pairs (1→2 and 2→1), testing the null hypothesis of equal frequencies between the two directions of change.

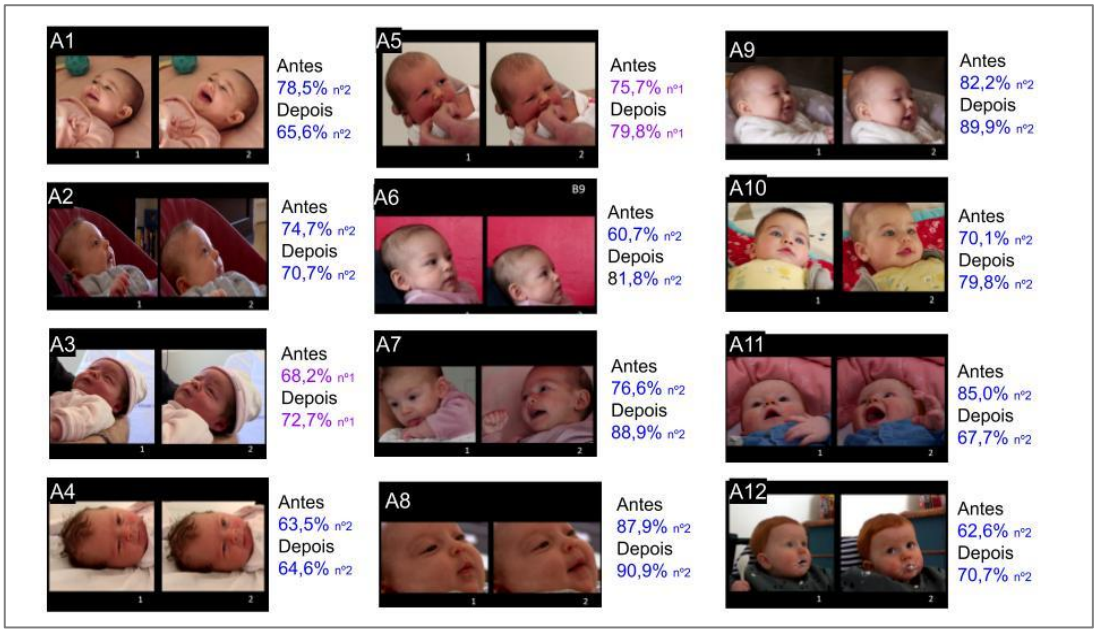
Given the relatively small size of some samples (n < 25 discrepancies), *McNemar* 's exact test (binomial) was preferred over the chi-square approximation, ensuring greater robustness in the results. For each image, the absolute number of changes, the percentage of participants who changed their response, and the corresponding p-value were reported. The significance level adopted was 5% ($p < 0.05$). All analyses were performed in Python (*statsmodels* package), with results organized into summary tables to facilitate interpretation.

### 3.1 Group 1 – N = 107

In the data relating to group 1 (Figures 1, 2 and 3), variation is observed in the patterns of change in choices between pairs of images after training. In pairs A1, A4, and A6, an increase was

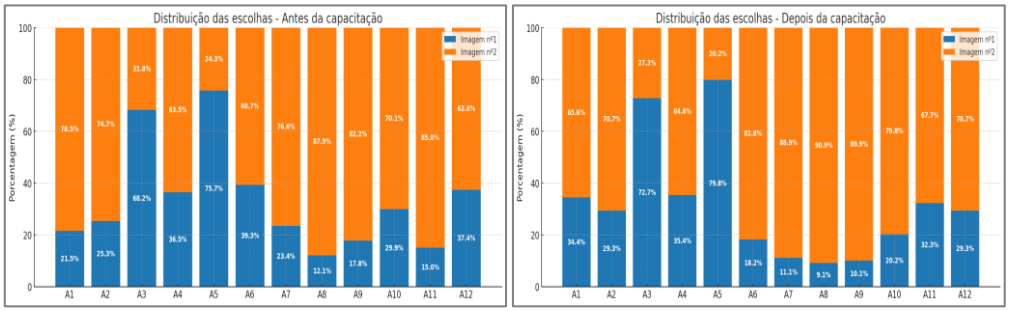
observed in the choice of image number 2 in the post-training period. In other pairs, such as A3 and A5, the distribution of choices remained similar between the pre- and post-training periods.

**Figure 1 –** Results regarding the choice, Group 1




Source: Prepared by the authors (2026).

**Figure 2 –** Distribution of choices, before and after Group 1 training




Source: Prepared by the authors (2026).

Figure 3 shows the most frequently used terms in the participants' descriptions before the training.

**Figure 3 –** Word cloud resulting from the qualitative analysis of choices made before and after the training of Group 1


Source: Prepared by the authors (2026).

A lexical analysis was conducted on the evocations produced by the participants before and after the training, using terms in the Portuguese language exclusively. The words were grouped by semantic similarity and counted in absolute frequency. For comparative visualization of semantic fields, word clouds were created; the size of each term corresponds to its frequency of occurrence.

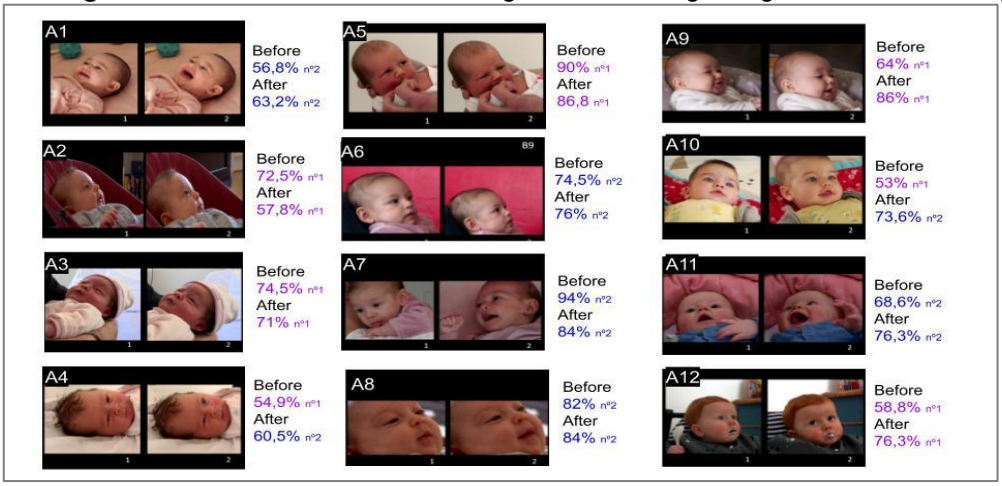
In the pre-training phase, the evocations focused on terms that express the observer's subjective impressions, inferences, and affective reactions. Eye contact (n=7), appears (n=6), smiling (n=5), gaze fixation (n=3), and communicative expression (n=3) stood out. There was also a frequency of words related to the aesthetic and emotional evaluation of the image, such as "cutest," "moved me," and "made me smile," in addition to imprecise qualifiers like "apparently" and "intuitive."

In the post-training period, a reduction was observed in the frequency of the lexicon associated with subjective impressions, as well as an increase in the recurrence of descriptive terms related to visual behavior and interaction. The predominant terms were “eye contact” (n=11), “gaze” (n=9), “eye to eye” (n=5), “focused gaze” (n=4) and “exchange of glances” (n=3). Furthermore, categories such as "directed gaze" and "fixation of gaze" began to appear, in order to broaden the elements considered in the description of the images. Taken together, these results indicate changes in the terms used to describe the baby's gaze after the training, with an increase in the criteria considered by the participants when interpreting the photos.

## 3.2 Group 2 – N = 51

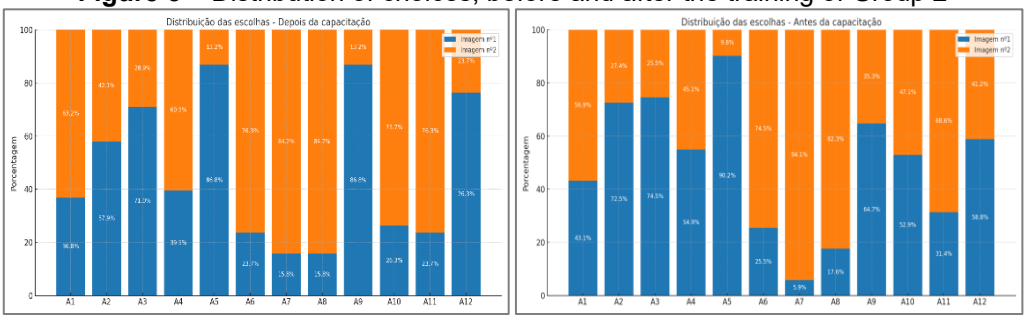
The data from group 2 (Figures 4, 5 and 6) indicate changes in the percentage of choices in various pairs of images after the training. For example, in pair A10, image 2 was preferred by 73.6% of participants after the training, compared to 53% who preferred image 1 before the training. There is also an observed increase in preference for image 2 in pairs such as A4 and A6. These results highlight changes in choice patterns after the training. Even when the predominant choice remained, as in A5 and A9, percentage variations were observed between the pre- and post-training periods.

**Figure 4 –** Instrument used for training and results regarding the choice of Group 2




Source: Prepared by the authors (2026).

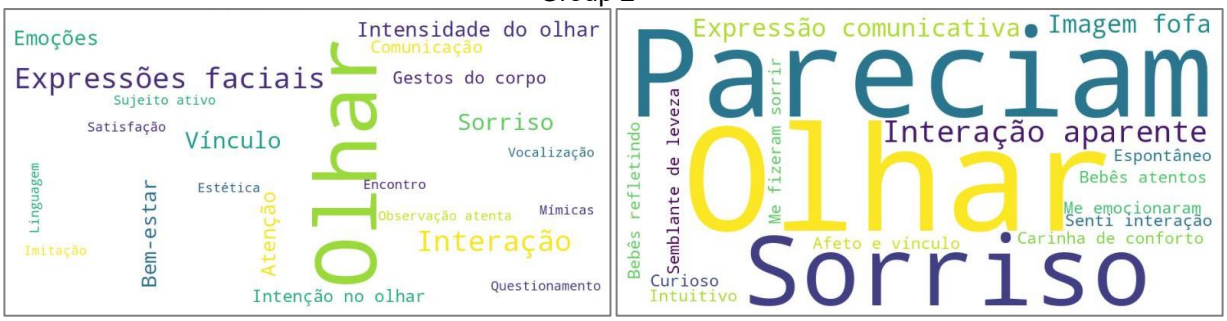
**Figure 5 –** Distribution of choices, before and after the training of Group 2




Source: Prepared by the authors (2026).

Figure 6 shows the most frequently occurring terms in the participants' descriptions before the second training group.

**Figure 6 –** Word cloud resulting from the qualitative analysis of choices made before and after the training of Group 2




Source: Prepared by the authors (2026).

A lexical analysis was conducted on the words evoked by the participants before and after the BabyLab Journey training. The evocations were grouped by semantic proximity and counted in absolute frequency. For the purpose of visualizing and comparing semantic fields, word clouds were constructed, in which the size of each term corresponds to its frequency of occurrence.

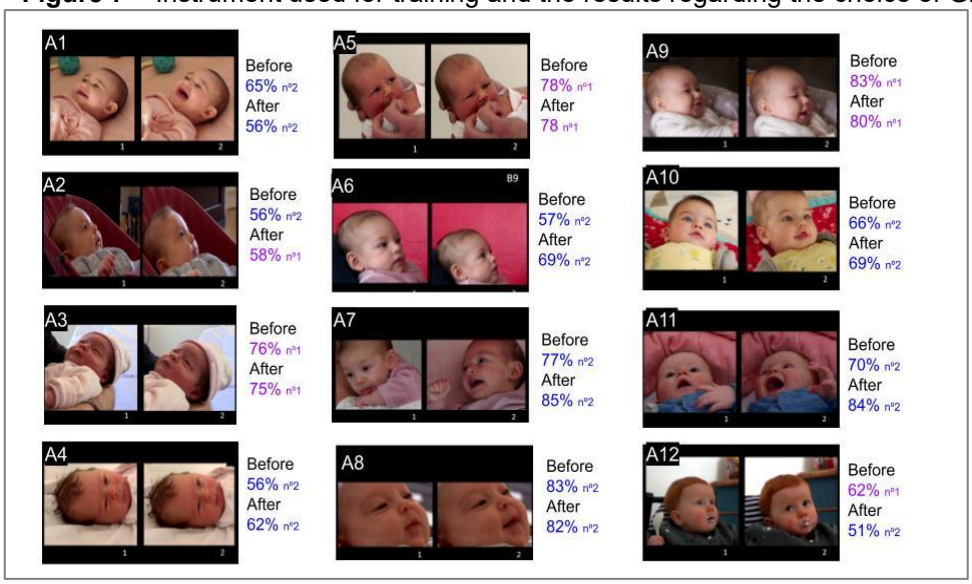
In the pre-training condition, the evocations focused on subjective and affective descriptors of the image, with emphasis on the terms "gaze" (n = 7), "appeared" (n = 6) and "smile" (n = 5). Terms expressing overall impressions and affective reactions of the observer were also frequent, such as "cute image," "moved me," and "made me smile," indicating a reading predominantly guided by affective responses.

In the post-training phase, a redistribution of the lexical repertoire was observed, with a greater recurrence of terms associated with interactional and communicative processes. The following stood out: “gaze” (n = 13), “facial expressions” (n = 7), “interaction” (n = 7), “bonding” (n = 4) and “baby’s well-being” (n = 3). Furthermore, terms related to the dynamics of interaction began to appear, such as "attention captured," "body gestures," "imitation," and "language transmitted by the photo," expanding the set of elements considered in the interpretation of images. Taken together, these results indicate changes in the patterns of image selection and in the terms used to describe them after the training, suggesting a broadening of the criteria considered by the participants in the analysis of the photos.

## 3.3 Group 3 – N = 89

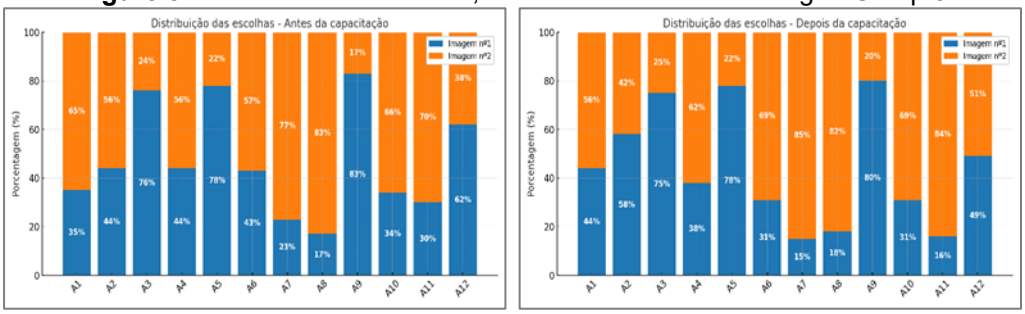
In the data relating to the application carried out during the WAIMH congress (Figures 7, 8 and 9), relative stability is observed in the image choices before and after training in several pairs, such as A3, A5 and A9. In other pairs, such as A10, A11, and A12, changes in participants' choices are noted, with a shift in the image selected between the pre- and post-training periods. These results indicate the coexistence of patterns of stability and change in choices, depending on the pair of images analyzed.

**Figure 7 –** Instrument used for training and the results regarding the choice of Group 3




Source: Prepared by the authors (2026).

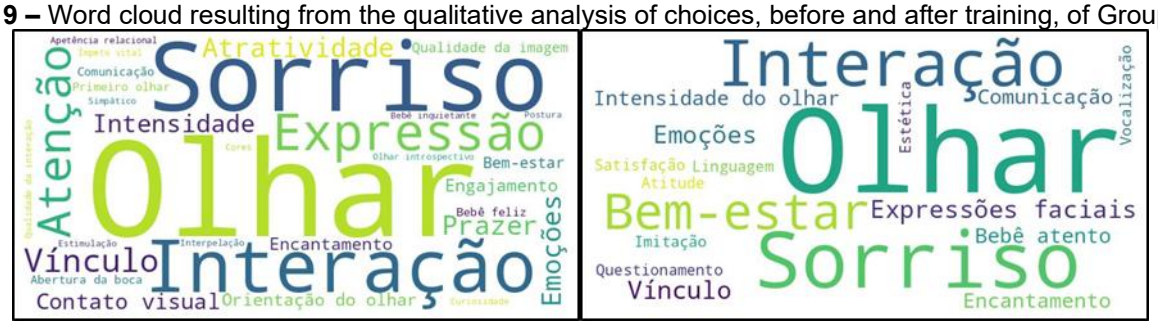
**Figure 8 –** Distribution of choices, before and after the training of Group 3




Source: Prepared by the authors (2026).

Figure 9 presents the most frequent terms in the descriptions provided by the participants before the training. For the analysis, a descriptive lexical analysis was performed based on the words evoked by the participants, grouped by semantic similarity and counted in absolute frequency. To visualize the data, word clouds were constructed in which the size of each term corresponds to its frequency, allowing for a comparative reading of the predominant semantic field at each moment.

**Figure 9 –** Word cloud resulting from the qualitative analysis of choices, before and after training, of Group 3




Source: Prepared by the authors (2026).

In the pre-training phase, a higher concentration of words associated with immediate perceptual aspects and the baby's visual expressiveness was observed, highlighting the terms "gaze" (n = 32), "smile" (n = 14), "interaction" (n = 12) and "expression" (n = 11). Terms related to the attractiveness of the image, the intensity of the reaction, and the emotional impact elicited by the observed scene were also frequent, pointing to a reading predominantly guided by aesthetic and affective aspects.

After applying the instrument, a redistribution of evocations was observed, with lesser semantic dispersion and a greater recurrence of terms associated with interactional and communicational processes. The words “gaze” (n = 18) and “smile” (n = 6) remained central, and were joined by terms such as “interaction” (n = 4), “baby’s well-being” (n = 3), “bonding” (n = 3), “communication” (n = 2), “imitation” (n = 1) and “language transmitted by the photo” (n = 1). These results indicate a broadening of the elements considered by participants when interpreting images after the training.

**Table 2** – Changes in classification between categories by image, with absolute frequencies, percentages and significance values (McNemar test)

| Image | N total | 1 → 2 | 2 → 1 | Total changes | % changed | p (exact) |
|---|---|---|---|---|---|---|
| 1 | 66 | 13 | 17 | 30 | 45,5% | 0,585 |
| 2 | 15 | 3 | 2 | 5 | 33,3% | 1,000 |
| 3 | 72 | 15 | 15 | 30 | 41,7% | 1,000 |
| 4 | 66 | 14 | 13 | 27 | 40,9% | 1,000 |
| 5 | 66 | 11 | 7 | 18 | 27,3% | 0,481 |
| 6 | 66 | 13 | 7 | 20 | 30,3% | 0,263 |
| 7 | 66 | 5 | 8 | 13 | 19,7% | 0,581 |
| 8 | 66 | 5 | 9 | 14 | 21,2% | 0,424 |
| 9 | 66 | 8 | 12 | 20 | 30,3% | 0,503 |
| 10 | 66 | 15 | 5 | 20 | 30,3% | 0,041 |
| 11 | 66 | 12 | 7 | 19 | 28,8% | 0,359 |
| 12 | 66 | 6 | 9 | 15 | 22,7% | 0,607 |

Source: Prepared by the authors (2026).

Analysis of the responses showed that, across all images, a significant proportion of participants changed their choice after the training, with percentage changes ranging from 19.7% to 45.5%. However, in most cases, the number of participants who switched from option 1 to option 2

was similar to the number who switched in the opposite direction (option 2 to option 1). This balanced distribution of changes explains the absence of statistical significance in most of the images.

Only Image 10 showed a statistically significant result in McNemar's test ($p = 0.041$), with a clear predominance of changes from option 1 to option 2. In the remaining images, despite significant percentage changes (greater than 30% in several of them, such as Images 1, 3, 4, 6, and 9), no statistically significant differences were observed between the two directions of change.

Given that the three groups have similar average ages, the differences observed in the patterns of change after training were analyzed in relation to the length of professional experience and the diversity of educational backgrounds of the participants. In Group 1, characterized by a greater heterogeneity in areas of expertise and a wide variation in professional experience, the changes were more dispersed among the different criteria used.

In Group 2, composed predominantly of professionals with more homogeneous backgrounds and shorter specific experience time, the changes were concentrated in some aspects of the perception of babies' expressions. In Group 3, which has a higher proportion of professionals with longer training paths, the changes were less significant in quantitative terms, and alterations were mainly observed in the criteria used after training.

This comparative analysis was conducted in a descriptive and exploratory manner, without the application of inferential statistical tests, considering the composition of the groups in terms of professional experience and areas of study.

## 4. Discussion

The results suggest that the training provided was able to promote reflection and recognition of babies' multimodal language by the participants, even when it did not result in a systematic shift towards a single option. Since between 20% and 45% of participants changed their response in almost all images, this indicates that the training had a practical impact, although it did not translate into statistical significance in most cases. Therefore, the training did not simply maintain previous choices, but triggered a process of questioning and reinterpretation.

Image 10 stood out for being the only one with a statistically significant change and a predominance of changes in the same direction. It is possible that the image represents a less obvious or less familiar expression for the participants before the training, making it more sensitive after the training. However, in other images, the changes occurred in both directions, which may reflect greater ambiguity in the interpretation of the situations depicted or less clarity in the transmission of the associated content during the training.

The results of this research indicate significant changes in the professionals' perspective after training on infant knowledge. It was observed that, prior to the training, many participants based their choices on subjective criteria, linked to their own feelings when presented with the image. After the

training, the justifications began to focus more on observing the multimodality of the baby's language, indicating a shift in focus from a) the participants' personal reactions to b) the baby.

This change is evident in the word clouds where terms like "it seems" and "I found" are replaced by words like "gaze," "interaction," and "attention." The shift also suggests that, after the training, professionals began to recognize that babies express intentions in a unique way. The change was not only quantitative, but also qualitative, since in some pairs of images there was a reversal in preferences, indicating that the professionals' perspective has become more discerning.

Photographs, as analytical tools, have proven to be powerful instruments for provoking this perceptual and reflective repositioning. This is in line with authors such as Colla, Hirson and Ferracini (2022), who highlight the role of the image as a field of perceptual and bodily activation that goes beyond aesthetics and acts on the plane of sensibility and language. Thus, the training may have broadened the professionals' capacity to observe and recognize the multimodal language of the baby.

Often, professionals who work with babies are unaware of the complexity of what babies are capable of knowing, perceiving, and expressing. This shift towards a broader perspective is evident in the data, which shows changes in image choices, and is also evident in the justifications used after the training. This indicates that the participants began to observe the babies with greater attention to what the baby itself was expressing, and not just to what the image evoked in the observer. Therefore, they began to recognize previously unnoticed nuances in expressions and interactions.

## 5. Final Considerations

The importance of ongoing training for professionals who work with babies on a daily basis is fundamental, as it is important to recognize the multimodal language of babies. Ongoing training expands the observation possibilities of these professionals. After training, professionals can recognize the baby's language expressions and are encouraged to listen to them.

We found that each training session had an effect. Previously, the professionals observed the babies who showed interaction through eye contact, smiles, and joy. After the training, these same professionals were able to recognize the multimodal language expression of babies more objectively.

Among the limitations of this study is the variation in the number of valid participants per image (n = 15 to 72) and, consequently, the exclusion of incomplete responses. This reduced the statistical power in some analyses, especially in images with fewer responses. Furthermore, the design of the form, with its two option answer pattern, while useful for simplifying the analysis, may not have fully captured the diversity of possible interpretations regarding children's skills. Another

limitation is related to the difference in the duration of training: the training conducted with Group 1 lasted 16 hours, while those conducted with Groups 2 and 3 lasted 6 hours.

In the long term, considering that the knowledge generated can be incorporated by legislators and administrators in assessing the importance of training people who work with babies, the benefit of the training can be of a social nature. Therefore, this work can contribute to Public Health Policies in the area of Child Health Care. Furthermore, knowledge of this reality can provide insights for the organization of institutional services.

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**Conflicts of Interest:**

In accordance with the journal's editorial policy, the authors declare that there are no personal, professional, financial, or academic relationships that could be interpreted as influencing the methods, results, or discussions presented in this manuscript.

**Financing:**

This research received no funding.

**Ethical Approval:**

The project was approved by the FAMINAS Research Ethics Committee on December 1, 2024, under decision number 6.545.556 and CAAE number 75933423.7.0000.5105, and was conducted in accordance with the ethical and legal precepts governing research involving human beings.

**Acknowledgments:**

We thank all participants and BabyLab CEREP Phymentin for their support in carrying out this work.

**How to cite this article (ABNT):**

GALVÃO, Gláucia Maria Moreira; GRATIER, Maya; NEGRI, Mariana; COSTA, Clara Affonso da; TAVARES, Ludmila; PROVERA, Alessandra; PARLATO-OLIVEIRA, Erika. Perceptions about babies: a comparative analysis using photographs in the evaluation of training processes. **Revista Educação e Linguagens**, Campo Mourão, v. 16, e162607, p. 1-19, Jan./Dec. 2026. Available at: https://doi.org/10.33871/22386084.2026.16.11087. Accessed on: [insert access date].

**Editor in charge:**

Deivid Alex dos Santos.