

Article

'I Should Do Her Finger Here, on Her Cheek—Hmm, to Play or to Draw? That's How One Thinks': What Preschoolers Tell Us about Thinking through Drawing

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Abstract: As the importance of developing good thinkers from an early age is widely recognised as an overarching goal of contemporary early childhood curricula, research on nurturing children's thinking continues to grow. This study sought to gain insight into kindergarten children's understanding of the concept and process of thinking. A socio-cultural perspective that conceptualises thinking and its development as a dynamic, socially mediated process, in which signs, including drawing, guided the research. 35 children from Greece, aged 4–6 years, participated in the study and were involved in a drawing-telling activity. Thematic analysis, which included both the drawings and verbal responses of the participants, resulted in five main themes that reveal new aspects of children's perceptions and reflect the inherent complexity of the concept of thinking. Although the findings have direct implications for teaching and learning in early childhood classrooms, the discussion calls for further research in this area.

Keywords: children's perspectives; thinking; sociocultural theory; drawing-telling activity; early childhood



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1. Introduction

Today's increasingly complex world requires individuals to develop their thinking dispositions and skills in order to face challenging problems, filter vast amounts of information provided by their environment, analyse and interpret data, and make informed decisions [1,2]. As a result, the importance of developing good thinkers from an early age is now widely recognised as an overarching goal (e.g., Project Zero; Philosophy for Children), with critical and creative thinking now included among essential 21st century skills [3]. Accordingly, there is a growing body of research on fostering children's thinking, suggesting practices such as the use of thinking language, inquiry and problem-solving, storybook reading, pretend play, questioning, modelling, decision-making, discussion, and reflection [4–6].

There is also extensive research on the development of children's metacognition [7], their awareness of the content of their thoughts [8], and the mental world [7–9], as well as on teachers' views of children's thinking and practices to develop it [10,11]. However, there is a lack of research on young children's own perceptions of thinking in educational settings [12,13] and in different contexts.

Therefore, in line with the importance of nurturing young children's thinking from an early age, our study sought to gain insight into preschoolers' understanding of the concept and process of thinking in the context of Greek kindergartens. However, investigating young children's perceptions of an abstract concept is a rather challenging task, which may, among other things, lead to misinterpretation of their voices. To reduce this limitation, this study used a drawing-telling activity [14], as a tool to enable children to communicate their insights. The research was guided by a socio-cultural lens that conceptualises thinking and

its development as a dynamic socially mediated process [15] and considers drawing as a mediating tool for making and communicating meaning [16,17].

1.1. Theoretical Framework

As Robson and Hargreaves [11] (p. 82) pointed out years ago, “defining what might be meant by *thinking*, in itself, is problematic”, demonstrating the difficulty of finding a common definition in the relevant literature, other than that it is a “mental act”. For Siegel [18] (p. 68), thinking is a dynamic process that involves and manifests “particular sorts of brain activity”. According to the APA Dictionary of Psychology (APA dictionary of Psychology <https://dictionary.apa.org/thinking>, accessed on 16 June 2023), thinking, as a “cognitive behavior”, includes “imagining, remembering, problem solving, daydreaming, free association, concept formation, and many other processes” and has “two defining characteristics: (a) It is covert—that is, it is not directly observable but must be inferred from actions or self-reports; and (b) it is symbolic—that is, it seems to involve operations on mental symbols or representations, the nature of which remains obscure and controversial”.

Drawing on Vygotskian ideas [15] about the role of language as a psychological tool, Fernyhough focuses on the social nature of thinking and argues that,

Thinking is conscious, and it is active. It is the kind of cognitive process that can make new connections and create meaning. It is dialogic: It has the quality of an internal conversation between different perspectives, although the ‘give-and-take’ quality of external dialogues may not always be immediately obvious. And it is linguistic: verbal for those of us who use spoken language, visual for those of us who use sign language to communicate with others and with ourselves. [19] (para. 13)

For Vygotsky, the “formation of mind is a socially mediated process” [20] (p. 41), which is developed through constant movement from the interpersonal to the intrapersonal level. New mental processes emerge through interpersonal exchange, while later, the shared thoughts and meanings are internalised by the child through an active and transformative process. As Karpov [21] (p. 17) puts it, “as the child masters the tool, it gets internalized and turns into an internal mediator of the child’s mental process”. In this sense, thinking is both an object of learning and a tool for learning. For Vygotsky [15], the process of thinking is mediated by signs, which are not only ways of conveying meaning, but also generate, structure, and develop thinking. Although Vygotsky emphasised the role of language in the development of thinking, he also mentioned other mediating systems, including drawing. Following this perspective and pointing out that “traditionally, interpersonal and intrapersonal interactions have been understood as primarily verbal”, Brooks [16] (p. 81) uses her empirical evidence to illustrate how drawing, as a visual language, contributes to shaping children’s construction of meaning.

However, when thinking is considered from a sociocultural perspective, the role of imagination and emotion cannot be overlooked. Vygotsky [22] argued for the strong link between imagination, reality, and emotion. He described imagination as the “creative activity, based on the ability of our brain to combine elements” (p. 3), either from our own experience (reality) or from the experiences and narratives of others. For Vygotsky, imagination is an essential aspect of thinking, while both have a dialectical relationship with emotion. As he puts it, “the fullness of life”, the “personal needs and interests, the inclinations and impulses of the thinker” cannot be separated from the process of thinking. “Every idea contains a transmuted affective attitude toward the bit of reality to which it refers” [15] (p. 10).

1.2. What Do We Know about Children’s Understanding of Thinking?

Children’s understanding of the mind has been extensively researched over the last 40 years within the frameworks of metacognition and the “theory of mind” (ToM). According to Astington, quoted by Papaleontiou-Louca [7] (p. 57), ToM is considered as the “understanding children have of their own and others’ minds and of the relation between the mind and the world”. The wealth of evidence over the years, although in some cases

contradictory, shows that by the end of the preschool period, children have acquired an impressive understanding of thinking, including metacognitive awareness [7,8].

However, a subset of this research has revealed significant constraints in the Theory of Mind (ToM) and metacognition of young children. In particular, for some scholars, preschoolers' (3–5-year-olds) understanding of thinking is rudimentary yet vital. Children interpret thinking as an inner human act that refers to or represents both imaginary and real events, and tend to believe that an individual needs a brain, located inside the head, to think [8]. At the same time, their communication of their thoughts to others was found to be effortful but weak. Thus, their descriptions of thinking were defined as poor [23]. Another study [24] found that young children are also unaware that thinking is a continuous rather than an episodic mental activity.

In contrast to the above limitations, recent evidence suggests that five-year-old children are aware of the continuous flow of thinking and the content of their own thoughts. Moreover, the descriptions they give of their thinking can be quite accurate [25]. In the context of reflective activities and problem solving, they manage to describe their thinking process in detail, discover weaknesses in previous actions, and even suggest improvements [26,27]. In any case, metacognition seems to emerge between the ages of 3 and 5, especially when teachers create a culture of thinking [12], use collaborative and problem-solving activities [28], and promote peer interaction and play in their classrooms [6].

To our knowledge, only two studies have investigated children's understanding of thinking in natural Early Childhood Education (hereafter ECE) settings. Both studies explored the enculturation of thinking using the Visible Thinking approach, covering various age groups (including children from 3 to 7 years), and employed Ritchhart et al.'s [29] data analysis framework. Salmon and Lucas [13] reported that children aged 3 to 5 related thinking to the objects and events of thinking (i.e., associative responses), while some older participants (5 years old) expressed more sophisticated views that linked thinking to the mental actions one takes during the thinking process (i.e., strategic responses). More recently, the findings of Gómez-Barreto et al. [12] confirmed the above evidence. Their professional development project to promote a culture of thinking in several classrooms had a clear positive impact on children's awareness of the thinking process. More importantly, the empirical evidence showed that after the intervention, the youngest children increased associative responses related to the human brain, while the oldest (aged 6–7) increased "strategic responses based on memory and knowledge" [12] (p. 15). In both studies, the children's responses were selected using the drawing-telling technique, which, as the researchers point out, enabled the participating children to make their understanding visible. However, in both studies, the analysis focused on the children's verbal responses, disregarding their drawings.

Taken together, the studies that have investigated children's perceptions of thinking have adopted a developmental approach. Conducted either from a ToM perspective or from a Visible Thinking perspective, the aforementioned studies have aimed to find out how children's perceptions develop with age or via interventions designed to promote thinking skills. However, solely examining children's perceptions of thinking from a developmental and metacognitive standpoint may hinder our understanding of the meaning that young children attribute to the concept and course of thinking.

1.3. The Greek Context

The recent reform of the Greek early childhood curriculum explicitly introduces the need for practitioners to cultivate young children's thinking. The following extract from the first pages of the curriculum document shows that the proposed "thinking tools" are an important aspect of the framework.

The model adopted in the Curriculum proposes a toolbox of four (4) slots, each of which contains three (3) categories of core competencies.

(a) Thinking tools: 1. Critical thinking, 2. creativity, 3. problem solving and reflective decision-making; (b) Science and technology tools: 1. innovation, 2. computational thinking, 3. design and construction skills; (c) Life tools: 1. personal

empowerment and social responsibility, 2. citizenship, 3. flexibility, adaptability, and resilience; (d) Learning tools: 1. Communication, 2. cooperation, 3. learning how to learn—metacognition. [30] (pp. 8–9)

As can be seen, three of the proposed tools (i.e., a, b, and d) include different aspects of thinking according to the terms used in the document, but without providing a complete and robust definition of either “thinking tools” or thinking. This means that the gap for teachers may be quite large, given that the previous Greek curriculum framework for kindergartens [31] only implicitly mentioned the development of thinking. Moreover, it has been found that Greek teachers are confused about how to promote children’s deep thinking, as they are mainly guided by a transmission model of teaching [32]. We firmly believe that to cultivate good thinkers in ECE, in addition to establishing a precise definition of complex concepts such as thinking, thinking tools, and skills within the curriculum framework, well-informed teachers who are knowledgeable of children’s understanding of thinking are needed.

1.4. Study Aim

The enhancement of thinking is crucial for young children’s present and future learning, as per existing literature. Scholars have argued that children’s own accounts of thinking can inform and support teachers in promoting thinking development in schools. Nonetheless, there is a dearth of international research in this area. However, the recent reform of the Greek ECE curriculum illustrates the immediate and pragmatic needs of Greek teachers in this domain.

Therefore, our study aimed to investigate children’s perspectives of the concept and the process of thinking, aged 4–6, in the absence of any prior intervention to enhance their thinking skills.

2. Methodology

In this study, we adopted a qualitative research methodology [33] to develop an in-depth understanding of the central phenomenon. Aiming to listen to the authentic voices of young children is a challenging task, and to do this, it is important to include the creative ways that children use to express their views and experiences [34]. Building on this premise, we employed a drawing-telling activity to collect our data. This is a graphic narrative process in which children depict their experiences on paper using both reality and imagination, as elucidated by Wright [14]. Drawing is an alternative language that enables the expression of diverse voices, including opinions, feelings, and abstract ideas that would otherwise remain unheard. Children use drawing to shape and communicate their perspectives [16,17]. This approach adds new issues and dimensions to the discussion that the adult researcher may not have foreseen. Drawing allows for reflection and examination of visual evidence at a later stage, aiding in comprehension during the discussion with the researcher [35].

2.1. Participants and Procedure

35 children (21 girls and 14 boys, mean age 5.4 years) from middle SES families in two kindergarten classes in the prefecture of Thessaloniki in northern Greece participated in the study. All participants were fluent in Greek and had no disabilities. After obtaining permission from the teacher and informed consent from the parents, the second author explained the research process to the children and asked them to express their willingness or unwillingness to participate in the study. Prior to data collection, the second author had spent three weeks in the classroom as a teacher’s assistant to achieve familiarity, acceptance, and openness with the children [36]. However, while collecting data, the researcher paid close attention to any signs of annoyance or distress, either verbal or non-verbal, on the part of the children. If such signs emerged, the researcher interrupted the interview and asked the child to participate at another time. Each drawing and corresponding interview was given a letter and number to ensure confidentiality (i.e., C1–C35).

To introduce the children to the research topic and establish a shared understanding, the researcher narrated an improvised short story (1'-2') that initiated a discussion about thinking. The story was about the adventures of Poof, a little bear, who had to deal with some simple challenges that day (e.g., where to find a present for a friend's birthday, what would make him happy, etc.). The story was followed by a discussion about the hero's concerns and how he could respond to the challenges he encountered. The researcher left the children to express their views without any guidance. At the end of the group discussion, the children were asked to make a drawing of a person who is thinking. The drawing activity was followed by a five-to-ten-minute individual semi-structured interview with each child. The order and wording of the questions could change according to each child's drawing or according to their answer to a previous question. The interview started with questions focusing on the content of the drawing (e.g., "Would you like to describe what you have drawn?", "Who is thinking here?", "How can we understand that he/she/they is/are thinking?"), followed by the central questions (e.g., "What is thinking?" and "What happens in our head when we think?"), and clarifying questions (e.g., "If another child came and asked you what thinking was, what would you say?"). All interviews were recorded and field notes were taken of any body language (e.g., gestures, facial expressions) that the children might have used to explain their words.

2.2. Data Analysis

Thematic analysis was used to examine the interview transcripts [37] and the children's drawings in parallel [38]. Specifically, for each drawing, we recorded the elements drawn (e.g., human figures, objects, concrete or abstract signs), any relationships or movements drawn and/or described (e.g., connecting lines) between these elements, and the child's follow-up explanation. The data from the drawings were then organised and cross-checked with the interview data for each participant. Although we took into account the existing literature and the categories assigned to children's responses by researchers in the field [13,29], our analysis was inductive. This means that, unlike previous studies that adopted a metacognition perspective and relied exclusively on verbal data, we immersed ourselves in the multiple sources of data provided by the drawing-telling activity and sought to identify themes that reflected the different meanings the participants ascribed to thinking through verbal, bodily, and drawing language.

Both authors were involved in the analysis process through a collaborative open-coding procedure. First, they individually analysed three interviews with the corresponding drawings and then discussed their coding (i.e., the content of the selected extracts and the code titles) to reach an agreement. The next step involved the analysis of the remaining data by the second author and the review of the entire analysis by the first author. Finally, they jointly revisited the analysed data and resolved any disagreements while assigning the final titles to the five emerging themes. The entire analysis was conducted in Greek and only the extracts used in this article have been translated into English.

3. Results

In the following sections, we present the research findings according to the five themes that emerged from the data analysis. The five themes: (a) thinking guides our everyday activities, (b) thinking represents manifestations of our brain activity, (c) thinking involves emotions and imagination, (d) thinking is a social and collective activity, and (e) thinking is visualised, bodily expressed, and verbalised, reflect the different aspects of the concept and process of thinking that children seemed to focus on during the drawing-telling process. Their perceptions were complex and included more than one aspect.

3.1. Thinking Guides Our Everyday Activities

Almost all participants associated thinking with everyday events/activities. For them, we always think about what we are doing or about our future actions. However, for some children, thinking is not only a process that precedes our actions, but also "something you

can create" (C1), which sometimes requires mental effort (e.g., C9: We have to think about it very well and do it), and is a necessary condition before acting (e.g., C25: Because she wants to do a job and she has to think about the job she is going to do). Thinking is also intentional and active, and often involves us in a process of wondering that allows us to figure out how to do something, as C20 (Figure 1) points out ("she is wondering, and what she is thinking is coming out, and she believes that she can do the dog [. . .] Yes, here she is thinking about how to draw a heart balloon"). From a similar perspective, C19 insightfully explains the potential impact of the absence of thinking on our lives.

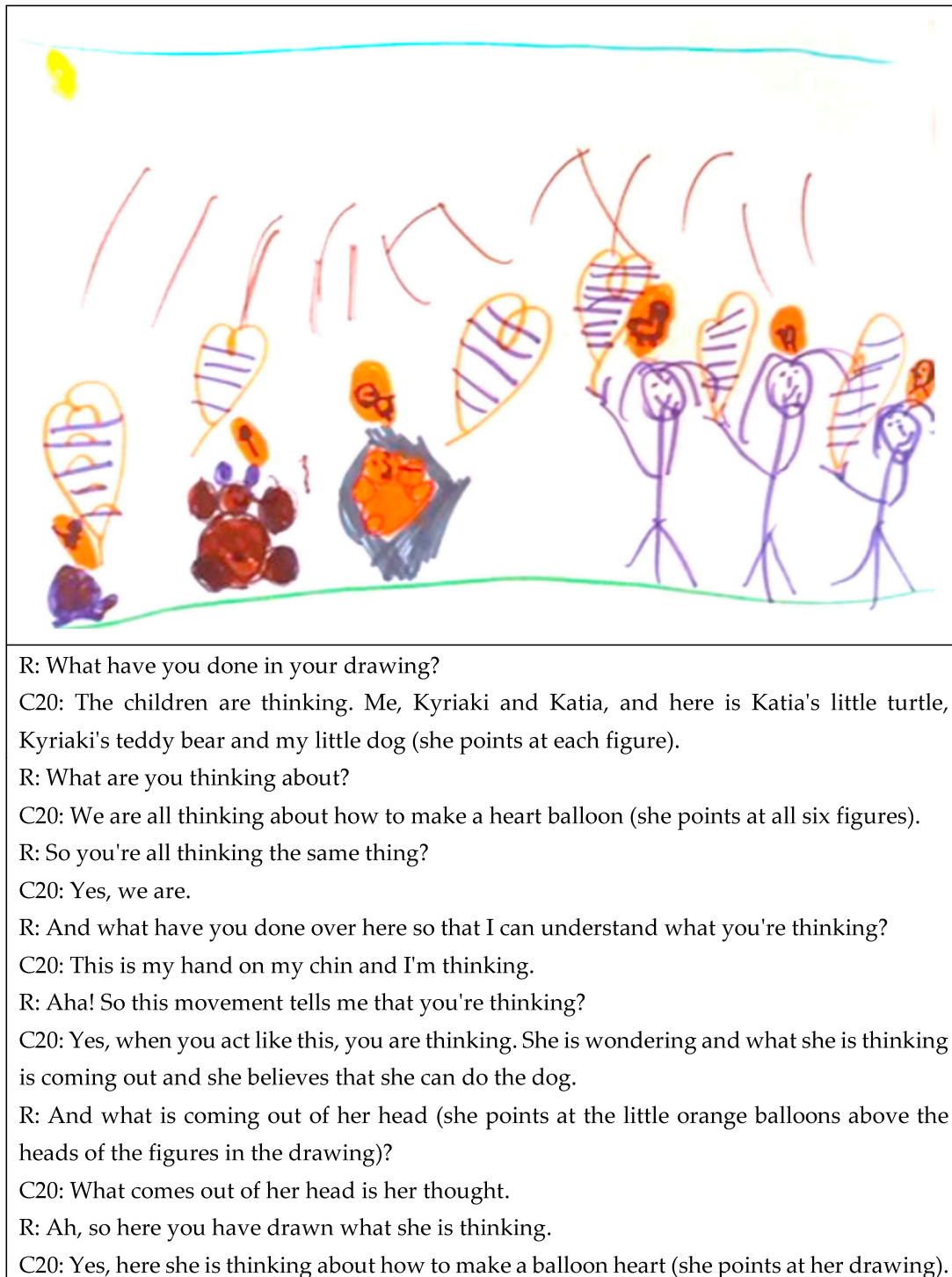


Figure 1. "We are all thinking about how to draw the heart balloons".

C19: If we didn't have a mind, we'd be scribbling, and we wouldn't be able to do anything nice.

R: So, what does the mind help us to do?

C19: Finding things, playing, making a nice room, playing games, making nice pictures and things like that.

3.2. *Thinking Represents Manifestations of Our Brain Activity*

Another theme that emerged from our analysis is the association of thinking with the human brain or mind. This association was quite strong, as it was not only evident in most of the drawings but was also included in the children's verbal descriptions of thinking. Specifically, most of the participants drew a small circle or other small signs inside or outside the head of their thinking figures that represented their mind or their thoughts. In many drawings, lines inside or outside the mind signs represented brain activity, while other lines were used to connect the mind to the head of the human or animal figure or to the objects of thinking.

Some verbal responses included simple associations between thinking and mind [e.g., C16: (thinking) is the mind; C1: (people think) with their minds]. However, other children, along with the mental activity depicted in their drawings, verbally described the mind or brain as something that "works" (C16), "creates" (C4), "comes up with ideas" (C1), or "is constantly working" otherwise "it would sleep" (C32). More importantly however, other verbal descriptions (after the question: "When we think, what happens in our mind?") included a visualisation of brain activity, such as the smoke metaphor:

C24: There is smoke in our minds.

R: Why does it have smoke?

C24: Because we think!

the color metaphor,

C25: As if the mind becomes colourful.

R: Why does it become colourful?

C25: As if they had written on me with lines of colour.

R: And what are these lines?

C25: What we think.

the lines metaphor,

R: And what do you think goes on in our minds when we think?

C37: The lines go down one by one for a person to think.

R: So, when a line goes down, what happens?

C37: The thought, like if I think about Tweety and a little flower with Tweety, what will happen? An idea will come to me.

and more complex images referring to a machine metaphor (Figure 2)

R: How do you think our thoughts are created?

C11: With the mind, which has some little cables that have these bubbles (she is pointing at her drawing a thought bubble) and in them are our thoughts and has a little ball inside for us to think and see what thought we want.

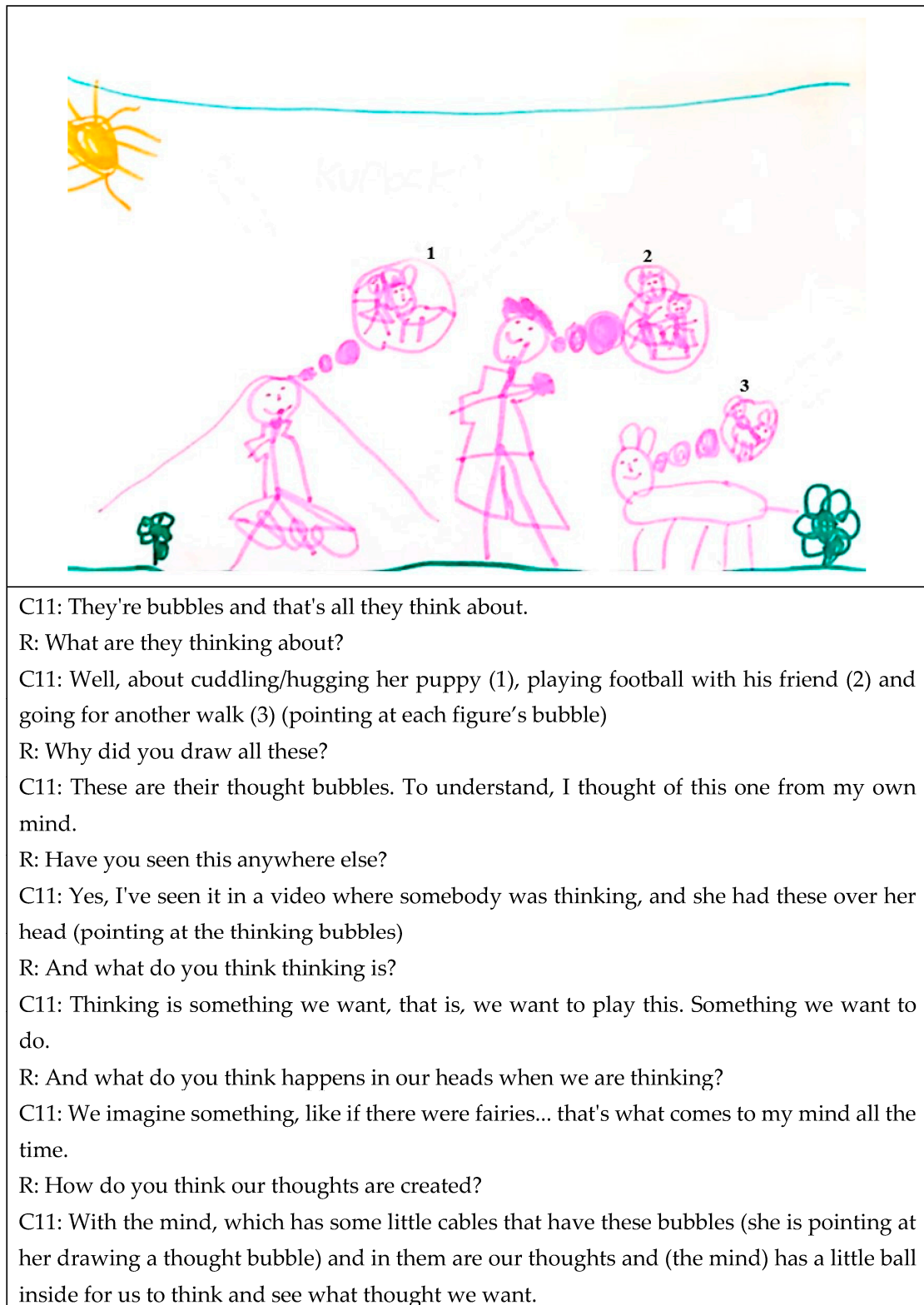


Figure 2. “With the mind that has some little cables...”.

3.3. Thinking Involves Emotions and Imagination

The children's responses, both drawn and verbal, also revealed an emotional aspect of thinking. Their descriptions included wishes for events that they wanted to happen (C30: I'm thinking about my dog being here, and me and Helen playing together), while they drew signs of happiness (e.g., smiles, cheerful jumps) or sadness (e.g., sad faces) to express pleasant or unpleasant thoughts, respectively (Figure 3). For example, C10 created a picture of a smiling girl jumping to demonstrate the pleasant mood caused by her thought of engaging in drawing. Her response shows the explicit link she made between thinking and affect (Figure 3, left). Similarly, other children seemed aware of drawing sad faces to represent unpleasant thoughts and feelings (Figure 3, right). When describing the two figures (i.e., two brothers) in her drawing, C8 asked the researcher "do you know why their faces are like that?", explaining that one of the brothers wanted to play alone and for that, "they are fighting", while adding that the coloured lines around the brothers represented their sad thoughts.



C10: The little child is thinking about drawing a picture and jumps up to the window, she's happy

C19: A sad little girl is looking for her friend because she has received a bad present.

R: What is she thinking?

C19: Telling her that the present is bad because it's a boy's toy.

R: And how do I know what the girl is thinking?

C19: Because she's sad.

Figure 3. Thinking includes pleasant and sad thoughts, which are bodily expressed.

Noteworthy was the response of C11, who not only associated thinking with emotion, but also included imagination in this association. As shown in Figure 2, she drew three smiling figures who were thinking about doing things they liked (i.e., herself thinking about "hugging her puppy", a boy thinking about "playing football with his friend", and a dog thinking about "going for another walk"). Shortly afterwards, when trying to explain the process of thinking, C11 associated it with imagining things we like (i.e., "we imagine something, like if there were fairies... that's what comes to my mind all the time").

What was also interesting is that when trying to explain what goes on in the mind when someone thinks, some children described the thinking process as "something nice".

C10 went further in explaining that it is ‘nice’ because “we think we can” and “our mind makes us think of nice things, like playing, making, working together, painting”.

3.4. *Thinking Is a Social and Collective Activity*

The social aspect of thinking, which sometimes is shared among people, is another theme that emerged from the children’s drawings and verbal descriptions. Although children were asked to draw someone who is thinking, many drawings included two or more figures involved in a thinking activity (e.g., Figures 1 and 3), represented by signs of thinking for each figure such as mind signs, thinking bubbles, and thinking process signs (i.e., connecting lines and thoughts). More importantly however, in some cases, the children represented a shared thinking process, which is explicitly described as the following extracts show:

C8: [I drew] two little people who are thinking about something; they are thinking about doing something together.

C20: We are all thinking about how to make a balloon heart (Figure 1)

C12: They’re thinking about going to the playground tomorrow (she drew seven children).

3.5. *Thinking Is Visualised, Bodily Expressed, and Verbalised*

Another view that emerged in the children’s responses is that thinking is visualised and bodily expressed. C2, for example, explicitly linked the process of thinking to mental visualisation.

R: And tell me, what do you think goes on in our minds when we think?

C2: Um. . . we see what we want to do [. . .] Um, we read books, we play together. . .

The visualisation of thinking was more evident in the selected drawings. This could be seen not only in the form of objects and activities of thinking that the children drew at random points on their page (e.g., C31: I’m thinking about the volcano, C5: She’s thinking about drawing something on the board’), but also in a more structured form, through thought bubbles (e.g., Figures 1 and 4). For example, C3’s drawing (Figure 4) demonstrated the process of thinking and its visualisation, but she went on to explain that we express the process of thinking with our body (i.e., “by holding our chin, walking worriedly or doing yoga”). However, another child suggested a different relationship between thinking and the human body, namely that our mind guides our bodily actions.

R: And what do you think the brain does when we think?

C4: It tells your hands what to do.

Last but not least was the view, expressed, however, only by one child, that thinking guides speaking. Demonstrating his awareness of this relationship, C14 explained the process of thinking as a brain activity that controls our verbal expression (i.e., “(the brain) finds what we want to say”).

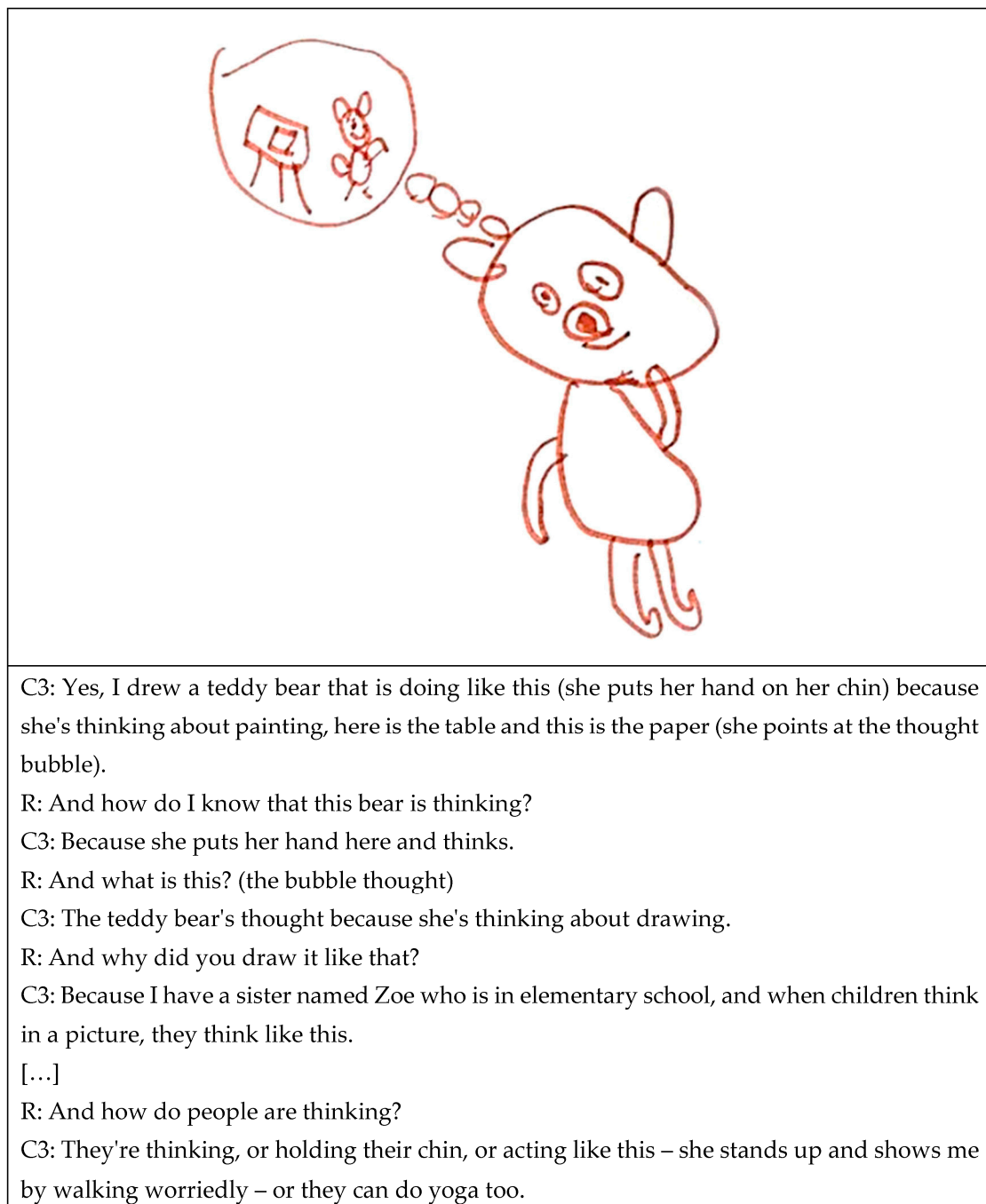


Figure 4. “They’re thinking or holding their chin, or acting like this (walking worriedly)—or they can do yoga too”.

4. Discussion

In this article, we sought to uncover young children’s conceptions of thinking using a drawing-telling activity. We theorized thinking through a sociocultural lens, and we examined children’s descriptions alongside their drawings outside the box of previous categorisations and beyond a metacognition and developmental framework. In doing so, we went deeper and uncovered perceptions that seem to have remained hidden in previous research [12,13].

Many of the children’s responses, especially those included in the first and second themes (i.e., (a) thinking guides our everyday activities, and (b) thinking is a manifestation of our brain activity), could be characterised as associative responses according to a previous

categorisation. Ritchhart et al. [29] (p. 152) have included in this category the responses that have a clear association with thinking but do not, at least explicitly, describe “the actual act of thinking”. However, our findings demonstrated that many children went beyond a simple association of thinking with objects, events, and the mind. They described thinking as a dynamic process that guides our activities, is conscious, active [19], effortful, and gives us a push to fulfil our desires. In other words, thinking seems to function for children as a broker for taking action in different circumstances, always in relation to their own experiences.

The dynamic and active nature of thinking was evident in both the visual representations of brain/mind and the verbal metaphors used by the participants. We already know from the literature on children’s drawings that when children draw, they use or invent a variety of “graphic devices” such as arrows and lines to construct and communicate complex meanings, movements, actions, emotions, transformations, and associations [14,17]. These graphic signs have been characterised as either “dynamic” or “action representations” [39,40]. From this point of view, we can assume that the variety of lines and arrows (i.e., lines connecting the mind to actual thoughts or depicting mental activity) and body movements (i.e., holding their chin or cheek, jumping) identified in the drawing data of this study, map the dynamic perspective of thinking that emerged from children. It is also worth noting that some children made this view more explicit by using the metaphors of smoke, colour, lines, and machine, which in some cases led to complex narratives to explain what happens in our minds when we think (e.g., C11). Taken together, such views are akin to Siegel’s [18] (pp. 67–68) definition of thinking as involving “mental acts or events” that “all depend on, or are manifestations of, particular kinds of brain activity”.

Constructing such images either verbally or graphically, the children in this study visualised the active nature of the process of thinking, while at the same time, some of them revealed an awareness that people construct mental images when they are thinking (e.g., C2: we see what we want to do). This perspective, that thoughts are visualized, was illustrated, although implicitly, within the thought bubbles found in some drawings [C3: (This is) the teddy bear’s thought because she’s thinking about drawing, Figure 4]. Thought bubbles as well as bodily movements, such as holding the chin and walking worriedly, both being cultural conventions, became the means for these children to communicate the covert nature of thinking, which is not directly observable [19], and which “can be inferred from actions or self-reports” (APA dictionary of Psychology).

If we examine our findings through the lens of Vygotsky’s [15] and Brooks’ ideas [16] about the mediating role of signs in the construction of meaning, we can suggest that the graphic signs (i.e., thought bubbles, mind signs, thinking signs, and connecting lines) and verbal metaphors generated by the participants in this study were not only carriers of meaning. Rather, they may all have contributed to shaping the children’s perceptions of the concept and the process of thinking because, although the verbal and graphic signs were invented by the children in response to the researcher’s request in this particular situation, they actually have their roots in culturally constructed images. Thought bubbles, lines, and cables in the brain, or connecting lines, like various other signs, are “common graphical practices of Western culture found in many visual texts” such as books, web pages, or popular culture products, which children observe, interpret, and transform in order to understand the world around them and to communicate their understandings [41] (p. 383).

Our findings identified two further aspects of thinking in children’s responses. As the current analysis shows, the process of thinking for children can be a collective activity, but it is also a process that generates and elaborates emotions. This kind of thinking arises in response to external social events (e.g., C19 drew a sad girl who wanted to share with her friend the sad thoughts and feelings provoked by a boy’s toy she had received, Figure 3, right) or is created by internally planning a future event (Figure 3, left). Taken together, these two features, the social and the emotional, were described by the children in such a

way as to indicate the reciprocal relationship between the internal and external worlds that characterises thinking when considered from a sociocultural perspective [42].

This interplay between the inner and the outer, the known and the unknown, was also highlighted by the emergence of imagination as an aspect of thinking. Although this aspect appeared in only three responses, it is worth looking at them in more detail. C17's description of her drawing (e.g., C17: A little girl is imagining what her first day at dance class would be like) reflects her perspective of thinking, that is, we imagine something we do not yet know. Similarly, another child (C35), who drew a boy visualising a Christmas tree (in a thought bubble), explained that he was "imagining what the Christmas tree will look like". This response suggests that we use imagination to speculate about future events that we are waiting for. Another link between imagination and the thinking process emerged as an example of the "what if" process (C11: we imagine something, like if there were fairies. . .). Combined, these perspectives seem close to how Fisher and Williams [43] describe the process of imagination as an aspect of thinking:

What imagination does is to enable the mind to represent images and ideas of what is not actually present to the senses. It can refer to the capacity to predict, plan and foresee possible future consequences. (p. 9)

5. Conclusions and Implications

Aiming to investigate young children's perceptions of the concept and process of thinking in the context of their classroom through a drawing-telling activity, the present study differs from previous research in this area. We adopted a sociocultural stance and conducted an inductive data analysis that incorporated both the drawings and verbal responses of the participants. Considering the challenges of investigating how young children perceive abstract concepts such as thinking, we focused on both the content of the drawings and the corresponding verbal descriptions provided by the participants. This decision enabled us to gain a deeper understanding of their responses and unveil aspects of thinking in their perceptions, uncovered until now. It is worth noting that the participants in the current study, unlike those in prior studies [12,13], were not subjected to any systematic intervention to enhance their thinking abilities.

The inherent complexity of the concept of thinking emerged from the children's accounts and seems to echo conceptualisations found in the relevant literature. The chosen stimulus of the task, which was to "draw a person who is thinking", enabled the children to relate to their everyday experiences and provide specific examples of situations where they engage in thinking. Most notably, many examples were associated with play activities or objects, which are an essential aspect of children's lives at this age. This helped them reflect on the thinking process and effectively communicate the varied meanings they attribute to it. The drawing activity allowed them to construct visual representations that merged their lived experiences with visual images they encounter in their environment. These cultural devices, however, transformed by the children, seem to function as tools for them not only to express their views but also to shape the concept of thinking.

This study has direct implications for teaching and learning in the early years. The neglected aspects of thinking that were found to be part of children's perceptions tell us that we, as adults, should find appropriate ways to access children's multiple views of thinking. When educators acknowledge children as agents in ECE and actively listen to their diverse voices, they offer them the space to contribute novel perspectives to the conversation that may otherwise be silenced. In doing so, teachers may have the opportunity to review and reflect on their own assumptions about children's thinking. By eliciting and documenting children's emergent narratives and representations of thinking (i.e., verbal and drawn metaphors), teachers can engage children in further discussions characterised by intersubjectivity. In doing so, children may become more aware of the impact of their imagination and thinking on particular situations in their everyday lives and recognise the interplay of their mental activity with their social and emotional world. As Papaleontiou-Louca [7] (p. 61) puts it, "talking explicitly about mental images would be one

natural way to exercise the imagination”, while “the continuous reference about people’s thoughts and feelings” and the use of “the internal-state words used by children” can be “contributing factors for the improvement of young children’s metacognitive awareness’ abilities”. Teachers can also encourage children to discuss their own and their peers’ representations of thinking and identify the similarities with those found in print and digital materials (i.e., books, comics). Last but not least, by explicitly connecting thinking with play, educators can guide children in recognising particular cognitive processes they employ when they face difficulties or challenges in play or in investigating how their thinking and play interact and progress.

All the aforementioned suggestions are crucial factors that should be considered by Greek educational policy while implementing the new ECE curriculum. For instance, teacher training initiatives intended to disseminate the new official document could incorporate not only the actual content of the curriculum but also the children’s views on significant issues pertaining to their learning, such as the ones that emerged in the current investigation. For the development of “thinking tools” and “thinking skills” in ECE, teachers need clarification on key concepts, including children’s understanding of the concept and the process of thinking. More importantly, involving Greek teachers in eliciting their students’ perspectives on thinking could serve as the first step of a training programme. Such a strategy could encourage reflection and potentially enable teachers to transform their teaching models.

Although the present study adds to our understanding of children’s conceptions of thinking, there are limitations that should be considered in relation to the resulting opportunities for future research. First, its narrow range suggests that further investigation is needed in different classroom contexts, cultures, and ages. Second, using drawing as a research method presents challenges when analysing and interpreting the visual documents [38]. Drawing is an open visual language, and analysing visual data can be harder than analysing verbal data. Nonetheless, it is important to acknowledge that both visual and verbal data are not culturally neutral. While this study is founded on sociocultural theory and acknowledges the impact of children’s backgrounds on their perspectives (be they visual or verbal) to decrease the risk of misinterpretation, the researchers’ subjective viewpoints have not been entirely eliminated.

Third, although the drawing task used in this study appeared to aid young children in recalling their own thinking experiences, there remains the possibility that it may have concealed certain aspects of their conceptions or hindered their ability to express their views fully, especially if they did not have proficiency in or enjoy drawing activities. Thus, the inclusion of additional alternative ways to elicit children’s views of thinking may be a methodological choice worth making in the future. Future research could also investigate the effect of developing students’ awareness of their conceptions of thinking on their thinking process and development. From the teachers’ point of view, it would be worth investigating if and how their awareness of children’s conceptions of thinking could contribute to changing and/or improving their practice in developing good thinkers.

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