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# Child-player and mother-spectator: mother–child interactions and maternal scaffolding during computer games

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Parent–child interactions during joint play usually involve parental scaffolding, with the more skilled parent playing a more competent role by supporting the child's learning and goal achievements. Parental scaffolding can promote children's learning skills and contribute to their development in many areas. However, in the unique context of computer games, children are frequently more skilled or feel more skilled than their parents. This situation raises the question of whether a parent–child joint computer game interaction can still be viewed in terms of parental scaffolding of any type; and if not, to understand the nature of the parent–child interaction in the context of this medium. Observations of 20 dyads of mothers and elementary school-aged children playing computer games yielded a three phase model describing the interaction: (1) initial interaction, wherein they assume the roles of the child-player and mother-spectator; (2) struggles between mother and child; and (3) ultimate resolution through various forms of cooperation and participation. The findings indicate that the nature of the medium and mothers' feelings of having lower skill and competence than their children often prevented them from scaffolding the specific task (the computer game played). This study demonstrates the conditions required for maternal scaffolding and expands our understanding of this developmental process in the context of computer games.

## KEYWORDS

maternal scaffolding, computer games, mother–child interactions, school-aged children, grounded theory

## 1 Introduction

Play is an enjoyable and entertaining activity that is also developmentally beneficial, particularly parent–child play (Ahmadzadeh et al., 2020; Flynn et al., 2019; Moon-Seo and Munsell, 2022). The literature shows that parent–child playtime, especially during the early years of life, contributes to the bond between parents and children, children's vocabulary, and cognitive development, and generally promotes learning skills and emotional development (Ahmadzadeh et al., 2020; Hiniker et al., 2018; Konrad et al., 2021; Wooldridge and Shapka, 2012). The skills acquired during joint play and the relationships established between parents and children can also affect children's academic success (Bhatti et al., 2021; Rathee and Kumari, 2022). Parent–child play also represents a rich multimodal learning environment, where meaning is constructed through multiple modes of communication including verbal exchanges, gestures, facial expressions, physical touch, and spatial positioning (Jewitt et al., 2016). As they play, parents and children draw upon the many modes available to them for

representing the meaning they want to express at a particular moment. Their experiences and interests, possibly representing their social experiences, which include family practices, local folklore, media perceptions, and the traditions of the playground, become apparent (Potter and Cowan, 2020). This multimodal perspective is particularly relevant when examining digital gameplay, where learning occurs through the integration of visual, auditory, tactile and social modes of interaction (Tang et al., 2024).

Parents' contribution to their children's learning during parent-child playtime is usually explained in terms of parental scaffolding (Wood and Middleton, 1975; Wood et al., 1976). Parental scaffolding suggests that parents, by virtue of having more advanced thinking and extensive life experiences, can offer their children new stimuli and ways of thinking during problem-solving tasks (such as those encountered in games or homework) and provide them with the support needed to face new challenges (Ewin et al., 2021; Mermelshtine, 2017; Wood et al., 2016). Parents' use of techniques or tools during play could allow the child to achieve and learn beyond what they could if unaided by an adult (Wood et al., 1976). In Vygotsky's (1978) terms, parent (or other more experienced persons)-guided interactions allow children to move to a higher level of thinking within the child's zone of proximal development. This occurs if the parent is skillful, their guidance is contingent on the child's needs, and the task presented is challenging but not overwhelming for the child (i.e., tasks that are slightly above the child's current competence).

Previous studies have identified four types of parental scaffolding (Ewin et al., 2021): (a) cognitive scaffolding that increases children's understanding of the content by the parent modeling and asking questions (Yelland and Masters, 2007); (b) physical scaffolding that includes parents helping children hold, use, and maneuver a part or device (Wood et al., 2016); (c) affective scaffolding that involves the provision of encouragement and feedback to the child, both verbally (such as praise, gasps, and laugh) and physically (such as patting, hugging, high-fives, and head nodding; Wood et al., 2016; Yelland and Masters, 2007); and (4) technical scaffolding, which takes place in technological environments and refers to effective learning strategies that highlight the features of the program and assist children in using the device (Ewin et al., 2021; Yelland and Masters, 2007). Parental scaffolding strategies have been linked to improved cognitive ability and executive functioning (see Mermelshtine, 2017 for a review). However, the association between scaffolding and socio-emotional development has not been sufficiently studied (Mermelshtine, 2017). In addition, existing research on parental scaffolding in informal learning contexts (e.g., spontaneous learning that takes place in home environments) and while engaging in shared computer activities, such as digital games, is insufficient.

Digital games (also known as video or computer games) occupy a central place in the lives of children and adolescents and are considered a favorite activity (Bochicchio et al., 2022; McGonigal, 2011; Rideout et al., 2010; Robidoux et al., 2019; Sabirli and Coklar, 2020). The rapid development of numerous digital games and the availability of platforms for playing them (personal computers, tablets, consoles, smartphones, etc.) have led to an increase in the proportion of child and adolescent players (Bochicchio et al., 2022; Rideout, 2021; Rideout et al., 2010; Smahel et al., 2020; Van Petegem et al., 2019). Children as young as 2–4 years old engage with computers (Wood et al., 2016), and the time spent playing digital games increases

consistently as they mature (Bochicchio et al., 2022; Smahel et al., 2020). Educational systems often employ this affinity of children and use digital games for learning (Aguilera and de Rooock, 2022). This further increases the frequency of children's engagement with these games, necessitating the examination of parent-child interactions and parental scaffolding in a technology context in general and digital games in particular.

Although several studies have examined parent-child interactions during the use of technology (see Ewin et al., 2021 for a review), few have focused specifically on parent scaffolding (Neumann, 2018a,b; Skaug et al., 2018; Strouse and Ganea, 2017). Those that have covered the topic have mostly examined parents' interactions with young children (toddlers and preschoolers). Literature on schoolchildren is scarce. As a child's age could, to a large extent, influence parents' scaffolding methods (Mermelshtine, 2017), it is important to learn more about parental scaffolding in this age group.

Additionally, in accordance with young children's cognitive and physiological abilities and skills, most studies have examined parental scaffolding while using a touchscreen tablet computer but have not addressed other digital platforms commonly used by school children, such as desktop computers and laptops (Bahçekapılı et al., 2022). As the type of platform used and its nature might influence the form of scaffolding offered by parents (Wood et al., 2016), it is important to further explore parent-child interactions while using desktop computers or laptops to understand how parents engage and support their school-aged children in this situation. This study examines the specific context of parents' and children's joint engagement in playing digital games.

Digital games generate unique situations in which children are often perceived as having more skills and experience than their parents (Chrysanthou et al., 2020; Delen et al., 2015). This unique situation raises the question of whether the interactions between parents and children when playing digital games involve parental scaffolding. If so, then what type of scaffolding? If not, then what is the nature of this interaction? These questions arise from the possibility that during the joint digital game engagement, there could be a situation in which the child is more skilled than the parent (or the child or parent may feel that the child is more proficient) and, therefore, more dominant and influential. As parental scaffolding is based on parents being more skillful and experienced in a situation, this different balance could prevent it from manifesting itself.

## 1.1 Current study

This study examined the interaction between parents and their school-aged children while playing digital games together on a computer. The study aims to explore whether this situation can be viewed in terms of the same parental scaffolding characteristics as for non-digital situations and, if not, to understand the nature of parent-child interaction in the context of this medium. Scaffolding in this study is defined as structured support through the learning process.

This study focused on the interactions between parents and their first- and second-grade children (ages 7–9). The focus on children in their first years of elementary school is based on the notion that, similar to younger children, this age group still plays with their parents a great deal and is quite dependent on them. Therefore, parental

scaffolding can still contribute to their development to a great extent. However, unlike younger children, this age group has usually acquired experience and skills in digital games and computer use (Smahel et al., 2020). Therefore, the nature of their interactions may differ from those observed in studies on younger children.

Given the exploratory nature of this study, the key research questions involved observing and documenting parent–child interactions while playing together. Based on the work of Wood et al. (1976) and Wood and Middleton (1975), parent–child dyads were asked to play computer games involving problem-solving tasks. Interactions during the joint game were analyzed qualitatively according to the principles of grounded theory (Lindlof and Taylor, 2002), through which a theoretical conceptualization of a certain phenomenon—in this case, whether there is parental scaffolding when playing a computer game and the nature of this interaction—was attempted. Additionally, based on the Multimodal Interaction Analysis Framework (Norris, 2004), which conceptualizes communication as a complex set of multimodal actions that include both verbal and nonverbal elements (Tang et al., 2024), different modes of communication in the interactions—verbal, gestural, spatial, and technological—were examined.

## 2 Methods

### 2.1 Participants

Twenty dyads of mothers ( $M_{\text{age}} = 39.89$  years,  $SD = 4.14$ , range: 32–48 years) and their children (12 girls;  $M_{\text{age}} = 7.82$  years,  $SD = 0.56$ , range: 7–8.9 years) attending first and second grades in Israeli state schools participated in the study. Participants were recruited via snowball sampling, wherein existing participants reached out to others. Although the researchers approached both mothers and fathers, only the mothers agreed to participate.

Most mothers had some level of higher education: bachelor's degree (40%), master's degree (15%), or doctoral degree or above (15%). A small proportion of the sample reported postsecondary education (10%) or a high school diploma (20%). In the interviews, all mothers self-identified as being familiar with computers, and most of them used different computer programs as part of their work.

### 2.2 Materials

A special webpage<sup>1</sup> was created for this study, with four games and instructions for play in Hebrew.

Games were chosen from the Yo-yoo site<sup>2</sup> according to the following principles: (1) They included problem-solving tasks, and (2) they included a learning process (and not just enjoyment) that allowed the participant to improve while playing.

The games chosen were: (1) Unblock Me—the task is to move the central block off the board by moving other blocks according to certain rules; (2) Flow Free—the task is to connect pairs of colored dots by

drawing lines according to certain rules; (3) Four in a Row—the task is to place four pieces so that they create a line (as a row, column, or diagonal). This is a competitive game played in turns, in which the participant plays against the computer or another player (i.e., two participants can play it concurrently); and (4) Water Measurement—the task is to fill an empty bucket with a specific amount of water using pipes.

### 2.3 Procedure

The second researcher contacted the mothers and explained the research process to them. For those who expressed willingness to participate, a visit was scheduled at a time that was convenient for their family. A single meeting was held between the second researcher and each mother–child dyad at the participants' homes. When the researcher arrived, after an initial acquaintance with the mother and child, the participants were told that the aim was to watch them play a computer game together. Both the mother and child gave their consent to participate (and be videotaped). The mother signed a consent form, following which the mother and child sat in front of a computer. Participants chose which computer to use (if they owned more than one) and where to sit and decided on the seating arrangement (where each one sat). The participants were asked to open the study webpage, choose one of the four games displayed, and play together for at least 15 min. Once they had finished playing, a short interview was held with the mother and child together in which they were asked to share their feelings and thoughts during the interaction, talk about their usual daily interactions, and describe their main purposes for using the computer and their usage frequency. The interviews lasted approximately 15 min (the entire meeting, including playtime, lasted approximately 30 min). The interactions (playing and interviews) were videotaped and transcribed.

### 2.4 Data analysis

Data were analyzed according to the principles of grounded theory (Lindlof and Taylor, 2002). Once all the meetings were completed, the two researchers viewed the recorded interactions, listened to the interviews, and read the transcripts separately, focusing on the various modes of communication manifested during the interactions and interviews, including verbal, gestural, spatial, and technological elements. While reading, watching, and listening to the material repeatedly, each researcher noted any recurring expressions and patterns and sorted them into preliminary categories describing the common themes of the findings grouped under it. For instance, the pattern that in all dyads at the beginning of the session, the mouse was controlled by the child, as well as the observation that in all cases, the child was positioned directly in front of the screen while the mother maintained a more peripheral seating position, were identified by each researcher. Subsequently, the two researchers met to discuss each identified category and theme. A more focused analysis of the categories was conducted to identify associations between the categories and reduce redundancies. For example, the two aforementioned patterns were consolidated into a single category, indicating that the child was the primary player at the onset of the interaction. Together, the two researchers defined the main categories, themes, and subthemes. Finally, the three main categories described in this study (three stages) were formulated. Later, the two

<sup>1</sup> <https://playresearch.wordpress.com/>

<sup>2</sup> <http://games.yo-yoo.co.il>

researchers chose representative quotations to illustrate the essence of each category and subcategory (the quotes chosen were translated into English by the researchers). Based on these categories, a theoretical model comprising the three stages was developed.

## 2.5 Ethical considerations

This study was reviewed and approved by a college Ethics Review Board. All participants were treated in accordance with the ethical standards prescribed by the American Psychological Association, and their participation in this study was voluntary. Initial consent to participate was obtained during a phone call with the mother in which the meeting was arranged. On the day of the meeting, the mothers were asked to sign a consent form that included an explanation of the study content and procedure, a commitment to maintain participant anonymity, and an explanation that the meeting would be videotaped for internal documentation purposes only. Each mother signed this letter stating her name, her child's name and age, and the date of the meeting. Pseudonyms were used throughout the study to maintain participants' anonymity.

## 3 Results

Following the meetings with the dyads and the analysis of these meetings, a three-stage model describing mother–child interactions while playing a computer game together was developed: the “Child–player and Mother–spectator Configuration.” The first stage refers to the initial *role division* between the mother and child, wherein the child plays the computer game while the mother watches (hereafter, “Child–player and Mother–spectator Configuration”). This initial configuration lasts a few minutes; however, as the mother becomes dissatisfied, the second stage begins with the emergence of “*struggles*” between the mother and child. These struggles are resolved in the third and final stage through the adoption of different *solutions*, including different forms of sharing and inclusion. [Figure 1](#) presents the course of the interaction between mother and child while playing the computer game together according to the different stages observed in this study.

### 3.1 First stage: role division of child–player and mother–spectator

As the dyads settled down to play, they encountered a conundrum posed by the medium; it was difficult to find a seating arrangement

that allowed both the mother and child comfortable access to the computer. This difficulty was more apparent when the dyads used desktop computers. However, regardless of the computer type (desktop or laptop), this difficulty was resolved by the different dyads in a similar manner, by adopting a role division in which the child played on the computer while the mother observed. That is, although participants were free to choose their seating arrangement in front of the computer, in all interactions, the mothers let the children sit in front of the computer while they sat next to them in a way that did not always give them full access to the computer. For example, Galit and her son, Mike, sat in front of a laptop placed on the kitchen table, with Mike sitting in front of the laptop and his mother beside him. Although laptops are mobile and two people can share control easily, they chose to position it in front of Mike while Galit observed from the side.

Among the different dyads, the mouse was almost always in the hands of the child from the beginning of the interaction. Even in the few interactions in which the mother was the first user, the mouse was quickly transferred to the child. For example, one mother, Dina, browsed the games at the beginning of the interaction, but very quickly; at the stage of choosing the game, she rotated the laptop toward her son, Tom, and gave him the lead.

By choosing this seating arrangement, the mothers granted the child a more active role from the start of the interaction—the player's role—and they functioned as spectators. Several possible explanations for this role division emerged from the interviews. One is that the mothers wanted to give their children the opportunity to feel active in the game, which could be played by only one person. For example, Tina explained, “If I take the computer, I'll be doing it [playing]. There's nothing to share. It's not like each person has their own cards.” Tina referred to the difficulty of using a computer together. She gave up the player role so her son, Avi, could experience the game. It was assumed that the player's role was reserved for her son.

A second explanation is that this customary role division characterizes computer games in everyday life. For example, Gal explained that she was used to her daughter Mor calling her to watch her play. “I do not have a lot of experience with this (the situation of playing together). Sometimes, she shows me stuff. If there's something she's really excited about that she really loves, she wants me to watch.” Gal's words demonstrate that mothers' near-automatic choice to remain spectators may have resulted from their habits. During the interviews, it became apparent that the participating mothers did not usually play computer games with their children and, on the few occasions they did, their role was simply to watch. In accordance with this explanation, it seems that not only did mothers see this role division as normal, but so did their children. Many of them maintained

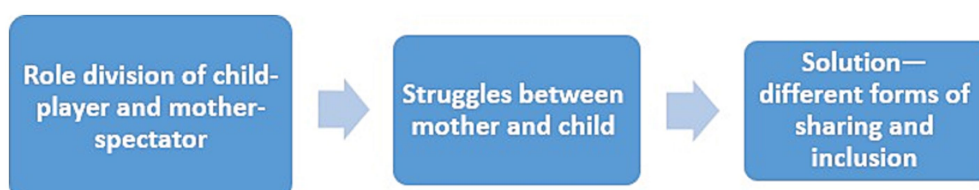


FIGURE 1  
Child–player and Mother–spectator Configuration model.



that they preferred playing alone or with their peers rather than with adults. For example, Ziv said, in the presence of her mother, Sara:

Researcher: “Playing a computer game is this something you would do together? Would it interest you?”

Ziv: “No!” Sara does not answer the question. Researcher: “Why not?”

Ziv: “Because I think it’s more fun playing alone. Then, only you get to choose the games.”

Researcher: “Would you prefer to play computer games with friends?”

Ziv: “Yes, because they are more like me. They understand it better.”

Ziv clearly stated that, in her opinion, computer games were intended for single, young players and admitted that she preferred playing with friends rather than with her mother.

A third explanation for the mothers’ behavior is related to their perception that digital games are mainly designed for children. Most mothers admitted they do not find this activity appealing and feel like “guests” in their children’s world; thus, it feels more natural for them to let their children be active players. As indicated by the interviews, their perceptions of playing digital games, lower skillfulness, and inability to participate meaningfully and scaffold the game also led to a difference in the satisfaction that mothers and children derived from playing digital games together. The children reported enjoying the games, whereas the mothers talked about their feelings about their children’s performance during the interaction rather than the medium itself. For example, when Sara and her daughter Ziv were asked about their feelings following playing a computer game together, they responded differently.

Ziv: “It was fun.”

Researcher: “Yes? Did you enjoy it very much?” Ziv nods in agreement and straightens her back.

Researcher: “How was it for you, Sara?” Sara’s chin is resting on her right hand, and she says in an uncertain tone: “All right.”

Researcher: “All right?” Sara answers hesitantly: “I was a little bored in the beginning.”

Researcher: “Why?” Sara is still hesitant: “I do not know, I just felt bored. I guess it’s because it was a computer game.”

This example reflects the divergence between mothers’ and children’s general attitudes toward games. During the interaction, Sara was less focused than her daughter. She did not show any willingness to be involved in choosing the games and passively accepted her daughter’s choices. Ziv showed greater interest in the game than Sara, who sat hunched far from the computer, whereas Ziv sat close to the desk. Throughout the interaction, Sara was the one initiating a switch to another game. Despite everything, Sara declared that she enjoyed

spending time with her daughter. Such behavior, which typified other dyads as well, illustrates mothers’ aloofness toward computer games. This attitude places a strain on playing together.

### 3.1.1 Mothers’ attempts to scaffold

During this phase, some mothers tried to actively influence their children by using the situation of playing together to teach, advise, and guide them. These efforts could be regarded as trying to initiate some kind of parental scaffolding, although they were mostly not concerned with the specific task placed in front of the dyad, but rather with scaffolding to develop “the child’s personality.”

For example, Betty, Dor’s mother, used the interaction as an opportunity to teach him how to make his own choices and be independent. The interaction began with her asking him to read the instructions for all the games and choose one himself. This could be seen as a kind of technical scaffolding, as it can be interpreted as helping him learn effective strategies to cope with the task of choosing a game; moreover, as she was trying to help him gain skills beyond the specific task and situation, it could also be interpreted as a kind of cognitive scaffolding. During the game, she avoided interfering, allowing Dor to decide what to do by himself. Betty said she behaved in that way to teach him the value of independent choice: “Let him experiment, experience it on his own, think independently, give it some thought.”

Other mothers tried to use the situation to help their children contend with personal challenges and develop the skills they deemed essential. For example, Maya attempted to guide her son David toward the solution throughout the game; however, as she did not fully understand the rules of the game, her scaffolding efforts failed. Her misunderstanding and erroneous guidance angered her son, and he scolded her a few times. Similarly, when Paula noticed that her daughter Laura wanted to switch to another game because she encountered difficulties in the first game, she attributed it to Laura’s tendency to give up when confronted with a challenge and insisted that she deal with the game she had chosen. Paula did not need to have any knowledge of the game itself or control the computer to teach her daughter an important lesson on coping with challenges. This was evident in the interview that followed the game.

Researcher: “How was the game for you?”

Laura: “Okay.” Paula adds: “Until she could not do it.”

Researcher (to Laura): “I saw that when you could not do it, you wanted to switch to another game. Why?”

Laura: “Because I could not understand what the blue one was doing there.”

Researcher: “So why did you prefer to switch games?”

Paula (laughing): “Because frustration is hard for us.” (Referring to Laura’s difficulty in coping with failure).

Researcher: “Does that only happen to her with computer games?”

Paula: “With everything. Anything she does not succeed in she tries to find a way around.”

Researcher: “Why was it important for you that she deal with it anyway?”

Paula: “Because it’s important that she deal with frustration and with things that do not always work out. We [my husband and I] convey the message that the important thing is the effort, not necessarily the outcome.”

Other mothers attempted to become involved in the game by giving their children challenges. For example, after Shir watched her daughter Fran pass level after level, she suggested raising the difficulty factor. When Shir asked, “Would you like to increase the difficulty a little? To more complicated levels?” Fran answered, “Yes.”

Shir left the choice to Fran. She did not try to force her to increase the difficulty but encouraged her to move on to more complicated levels by asking a question, which can be interpreted as cognitive scaffolding. Although Shir brought up the possibility, Fran’s consent was required to raise the game’s level of difficulty.

In some cases, mothers’ attempts to scaffold and become more involved were unsuccessful. For example, Tina tried to guide her son Avi toward an informed choice of a game by reading the names and descriptions. Tina tried to direct him toward what she thought was “a nice game.” Eventually, Avi made a different choice based on his own considerations.

In conclusion, the division of letting the child lead the game while the mother assumes the role of spectator stems from the nature of the medium and the differences between mothers and children regarding their knowledge, interest, and perception of the medium (the computer game). The mothers described a sense of detachment from the medium, and some were accustomed to being spectators in this context.

### 3.2 Second stage: struggles between mother and child

The child-player and mother-spectator role divisions place the mother and child in positions different from those with which they are familiar in many other contexts. In most aspects of life, the mother has experience and knowledge, guides the child, leads interactions, and uses scaffolding to encourage learning and promote skills. However, in the context of computer games, roles are often reversed, with the child assuming a leading and sometimes guiding role. The mother remains on the sidelines, usually just as a spectator; the cases wherein the child allows her to advise them are few.

This unconventional role division can cause mothers and children to experience various feelings and exhibit different behaviors. Some mothers accepted the new situation or used it as a means to develop their child’s personality and skills, which were not directly linked to the specific task. However, most mothers found this difficult (as noted during the interviews). One example relates to reading the instructions for the games, as noted in the following interaction between Tina and her son Avi:

Avi begins to play the game. Tina tries to read the instructions but does not get the chance to finish.

Tina: “Wait, level, which level? Start from one.”

Avi: “There’s only one.”

Tina: “No, there are different ones... what do we do? I’ve no idea... we should have read the instructions.”

Later on, Tina returns to reading the instructions. However, Avi again demonstrates that he does not need instructions. Avi moves the game piece.

Tina: “Did you move them?”

Avi: “Yes.”

Tina: “But we have not read the instructions, let us go to the instructions.”

Avi: “No.”

Tina: “Do you understand what you have to do?”

Avi: “I understand.”

Without further discussion, Avi simply avoids responding to his mother. However, in the case of another pair, the daughter, Nancy, expressed disdain toward her mother’s wish to read instructions. While Bella was trying to read the instructions for Flow Free, the following conversation took place:

Bella: “Do you know it?” Bella looks at Nancy, whereas Nancy is focused on the screen, nodding and smiling.

Bella: “You’re going too fast... one moment.” She tries to read the instructions again. Nancy starts playing and laughs.

Bella (smiling): “Wait, I have not read the instructions yet.”

Nancy: “You do not need to read the instructions.”

Bella: “Then explain it to me.”

In both cases, mothers required a certain structure and order. In contrast, children did not feel the same need; for them, a considerable part of the game experience possibly involved trying to determine what to do. Thus, the mother struggled to find order and logic by reading instructions while the child started playing. This gap often led to explicit (for example, one side demanded a certain behavior and the other refused) or more implicit (such as when one participant’s requests were denied by the other) struggles. A notable example of such behavior is the interaction between Merav and her son Sam. At the beginning of the interaction, Sam chose Unblock Me, while Merav insisted that he should first look at all the available games and then decide which one to choose. However, Sam quickly chose the first game he liked. When Sam accidentally returned to the selection screen and tried to determine how to go back to the game he had chosen, Merav said, “Let go of the mouse” and quarreled with him. She commented on his lack of patience in waiting until the game was loaded, saying, “Let it work.” Meanwhile, Sam insisted on not allowing her to use the mouse, and Merav let him use it with a sigh of

desperation or anger. Sam reloaded Unblock Me and started playing while his mother read the instructions. When she saw Sam moving on without reading the instructions and leaving her behind, she demanded the mouse and physically tried to wrest control from him.

Throughout the interaction, Sam understood how to play the game; it was clear to him that vertical blocks could only move up and down, whereas horizontal blocks could only move from side to side. Merav, however, failed to grasp this mechanism. Despite not understanding the gist, Merav tried to intervene in Sam's game. Initially, she assumed the role of adviser; however, when Sam saw that his mother's advice was incongruent with the mechanism of the game, he stopped listening. When Merav saw that Sam was not reacting, she tried to take the mouse from his hand. This highlights the role of the medium in generating conflicts. If the input device had allowed both participants to play, such a struggle would not have occurred. In this case, the limited means of control over the medium led the mother to invade her son's space and display aggression, which resulted in the child refusing to include her in the game and not responding to repeated attempts to influence him.

Esther and her daughter Miri also played Unblock Me. As in the previous case, Miri understood the rules of the game whereas Esther had difficulty. At the beginning of the interaction, Esther watched her daughter play. At some point, Esther asked for the mouse to try to determine how to play the game. Miri agreed but soon lost patience with her mother. From the moment the mother had the mouse, she refused to give it back to Miri and insisted on learning how the game worked. Only after the daughter implored her several times did Esther give the mouse back to Miri. This shows that the mouse can potentially become a source of dispute.

Another case demonstrated that once the children started leading the game, they would not give up their leadership position to the point of not wanting to let the mother participate in the activity. Terry gave her daughter Jane complete freedom, from the choice of games to role division. After Jane played for a few minutes, Terry asked her to let her play, but Jane did not allow it unless it was in accordance with her conditions. Terry asked Jane to pass the mouse to her; however, Jane did not respond and refused to include her mother. Then, the following conversation transpired.

Terry: "[I see] you are not getting disqualified; when will it be my turn?"

Jane: "In... 100 h." Terry giggles. Jane completes the level and says, "I'm done."

Terry: "Nice."

Jane still does not permit Terry to play. Terry does not insist and lets Jane continue playing.

A few minutes pass. Jane carries on playing, and Terry only observes.

Jane: "Oh, this is easy."

Terry: "So if you pass 10 levels; then it's my turn."

Jane is silent, does not respond, and concentrates on the game. Eventually, Jane says: "So at [level] 11 you can play." Terry giggles.

Jane: "Okay?"

When Jane finishes level 11, she turns the laptop toward her mother: "Here."

Terry: "Okay, I'll try."

Terry uses her right hand to control the mouse pad, while Jane observes and comments every now and then. They both concentrate on the game.

Terry: "I did it."

Jane: "Good."

Terry: "Shall I do 12 and 13?"

Jane: "Yes." Terry passes a level. Jane turns the laptop toward herself.

Jane: "Now, now let us play another game."

Terry (looking at the screen): "You want another game?"

Jane: "Yes."

Terry: "Okay."

Evidently, Jane was the one making the decisions, and Terry needed her approval for when to play and when to pass it back to her. Terry was not the one deciding to switch games either. Jane set the conditions according to her personal preferences.

These situations illustrate the struggles that emerged following the division of child-player and parent-spectator roles. They highlight the feelings of frustration evoked by the very nature of the situation: a medium that is not suited for two users, perceived knowledge gaps between the mother and her child, mothers' feelings of disconnection, and children's pleasure from leadership. These struggles lead to changes in the dynamics and role division when playing the game.

### 3.3 Third stage: solution—different forms of sharing and inclusion

The struggles generated by the child-player and parent-spectator role division led to various attempts to overcome the difficulties and gaps inherent in the situation. Participants attempted to find a solution that would allow both parties to participate, cooperate, and share the experience.

#### 3.3.1 Playing a game for two

One way that enabled both the mother and her child to participate was by choosing the game Four in a Row, which allowed them to play against each other. The game is based on players taking turns, so both players alternately hold the mouse. Dorit and her daughter, Leah, chose to play this way. When asked why they chose

this particular game and played it against each other, they answered as follows.

Researcher: “You could have played against each other, or both of you against the computer, right?”

Leah: “One of us against the computer.”

Researcher: “Right, so why did you choose to play against each other?”

Dorit: “Because it’s more fun to play as a twosome.”

Leah: “Because she (referring to her mother) is very bored, so it has to be a bit fun for her.”

Dorit: “I did not want to be a spectator all the time.”

Leah realized that most games are intended for a single player, which means that only one of them could play, whereas the other would have to watch. Dorit also knew that to take part, she would have to change her position from a spectator. Playing Four in a Row allowed them to eliminate the division of child-player and parent-spectator, such that both of them could play.

### 3.3.2 Taking turns in playing a game for one

Some pairs chose a game for one but played it in turns. One example is Sara and her daughter Ziv. Sara and Ziv played Flow Free, which was clearly intended for one player. Despite this, Ziv drew one colored line and immediately allowed her mother to draw a second line. Without being required to do so by the game, they intuitively found a new way that allowed both of them to participate actively. In the interview, Sara and Ziv were asked why they had chosen to play that way.

Researcher: “Whose idea was it to play one color each, in turns?”

Sara points to Ziv. Ziv: “Mine.”

Researcher: “Why did you think of doing it that way?”

Ziv: “Because then we play in turns.”

Researcher: “Why was it important for you to play in turns?”

Ziv: “Because I do not want to be the only one having fun.”

Two other pairs, Rachel and her daughter Tali and Dorit and her daughter Leah, played Flow Free in the same way as Sara and Ziv—in turns. In all three cases, the initiative to take turns came from the child and not the mother. For example, in the case of Rachel and Tali, Rachel loaded the game and immediately let Tali play in accordance with the role division of child-player and parent-spectator. However, after drawing one colored line, Tali immediately gave the mouse to Rachel, saying, “Now it’s your turn, Mom.” When Tali was asked why she chose to play that way, she replied, “Because there’s only one mouse.” Tali realized that because the computer did not enable

sharing, creative solutions were necessary. Playing in turns was an effective solution.

### 3.3.3 The child plays—the mother supports

In other cases, the child-player and parent-spectator role division remained unbroken, but participants displayed other forms of inclusion. For example, the mother remained in the position of a spectator, but the child involved her by sharing their feelings, musings, and desires about the task. In the case of Bella and Nancy, although Nancy was in no hurry to let her mother play, she did share her thoughts with her.

Nancy played Four in a Row against the computer. The computer was leading.

Nancy: “Cheeky.”

Nancy thought for a moment about the next move. Bella: “Wait, think.”

Nancy: “I’ll block it.”

Nancy defeated the computer. Bella: “Very nice! You win!”

Nancy: “Yes! Now I’ll go to... what’s that?”

Bella: “It’s a menu with different games.”

Nancy thought for a moment, then said, “You know what? Another game.”

Bella: “You want another one?”

Nancy: “Yes, the first one that you mentioned....”

Bella: “Isn’t it a bit hard?”

Nancy: “No, it’s not hard. It’s easy.”

Clearly, Nancy did not let Bella lead the interaction and made the decisions herself. However, she did share her actions and feelings with her mother. When frustrated, she communicated this to her mother; when she won, her mother responded and praised her, demonstrating affective scaffolding. This case illustrates that the role division of child-player and parent-spectator can still involve sharing, some form of playing together, and parental scaffolding.

In another example, Tina and her son Avi chose the Water Measurement game, which required mathematical thinking. At first, neither knew what they were supposed to do in the game. Tina managed to convince Avi to watch the short videos explaining how to play it; however, even with this input, they had difficulty understanding how to play it in practice. In the first few minutes of the interaction, they gave each other ideas on how to play.

Tina: “Oh, I think this is difficult.”

Avi: “Still, it’s a challenge.” They began playing with Avi using the mouse.



Avi (says to himself): “Let us put this one here. So far so good.”

Tina: “Can you also move the blue container?”

Avi (trying to move it): “No, not this one.” Avi then moved to another container.

Tina: “Oh, there you go. Now how does it pour.”

Avi: “You click on the side. I just did not place it correctly.”

Tina: “Why, I think you placed it great. Maybe like this? On this one, yes. Try for a moment; on this triangle.”

They successfully passed this level. Tina smiled and looked at Avi: “Well done; there you go.”

Tina and Avi tried to figure out the game together, by trial and error. Although Avi understood the rules of the game faster, they nevertheless learned them together. In this game, each level was very different from the previous one and involved the addition of a new element that required players to reconsider what to do and how to use the new tools. Tina insisted on contributing to the thinking process, and Avi enjoyed including her. When they managed to solve it together, they both enjoyed the result. Tina used affective scaffolding, expressed in her encouraging him and praising his moves (verbally) and in celebrating every success with a high five, mutual smiles, and eye contact (physically).

Other forms of support in the child-player and parent-spectator role division involved occasional non-verbal communication alongside the verbal sharing of the experience. For example, Neta leaned on her mother Yael and hugged her throughout the interaction. The presence of the researcher made her feel a little shy, but she still maintained contact. Kitty and her daughter Lisa leaned on each other, and Kitty stroked her daughter's hair and back throughout the interaction. Her position as parent-spectator enabled her to communicate nonverbally with her daughter. These cases show that even though the mother was not actively involved in the game, it did not mean there was no sharing in the interaction and that the mother could still perform affective scaffolding.

The different solutions adopted by the pairs show that despite the challenges of playing a computer game together, many participants managed to find ways to play cooperatively and did not have to accept the predefined role division of child-player and parent-spectator. In many cases, the child was the one who broke the conventional role division, whether by proposing full equality or by granting the parent a meaningful role, even from the spectator's position. In these cases, maternal scaffolding, mostly affective scaffolding, was possible.

Tina summed up the experience by saying she found value in playing computer games with her son (Avi). She stated that certain computer games have more value than board games.

Researcher: “Having experienced playing a computer game together, is this an activity you regard as quality time?”

Tina: “Yes, we had fun. Yes, I think I do. Everything that involves interaction... if it was just sitting in front of the computer and watching, then no. But say, something like this, which is a thinking game, in which I can have a role as an adult, then yes. But not

something that is fake [...] There is something authentic here; I do not have to pretend [...] What I like here is that there's an opportunity for feedback, that's what I'm interested in. That I can encourage him a lot [...] I do not like board games, for example, because they force me to descend to a level that is below my level [...] Here we have something that is shared.”

Tina believed that the game type contributed to the nature of the evolved interaction. She asserted that both the child and mother must feel challenged by the game, such that the mother feels compelled to participate in the game in one way or another.

The various observations indicate that the type of game affects the nature of sharing, confirming her claim. Tina and Avi, as well as the other dyads who chose to play Water Measurement, focused mainly on thinking together and trying to understand the rules of the game. Flow Free often became a game played in turns. Four in a Row encouraged some dyads to compete against each other or discuss strategies that would help the player (usually the child) defeat the computer. Unblock Me usually did not encourage sharing and inclusion, but it did allow mothers to react to their children's ability to solve the riddle quickly, encourage them, and increase their faith in their own abilities.

The type of game affected the nature of sharing. However, the possibility of the mother engaging in scaffolding was more affected by her child's willingness to include her in the game. Maternal scaffolding, predominantly affective scaffolding, was possible in all four games when the children agreed to interact with their mothers, share the game with them, and assign them a role.

## 4 Discussion

This study examined the interaction between mothers and their children in the early elementary school years while playing a computer game together using a multimodal interaction analysis (Tang et al., 2024) that attended to different modes of communication—verbal, gestural, spatial, and technological. The aim was to examine whether this situation could be viewed in terms of maternal scaffolding, similar to mother–child playtime, in previously studied contexts. The findings suggest that mothers experienced difficulties with scaffolding in this situation. Based on an analysis of the interactions in 20 mother–child dyads while playing a computer game together, a three-stage model was formulated to describe the course of events. The model, termed the “Child-player and Mother-spectator Configuration,” demonstrates that, throughout gameplay, the child leads the situation and is the primary decision-maker. In contrast, the mother's role is often more marginal, with no meaningful ability to affect or lead the course of the game. This situation contrasts with the division of roles in many other playtime situations in which there are interactions between parents and children wherein the parent is usually the leader and guide and uses scaffolding to support the child's learning and interactions (Ewin et al., 2021; Mermelshtine, 2017).

The model demonstrates that because of the nature of the medium (i.e., the computer is intended for one user, and most computer games are intended for a single player), as well as from differences in how mothers and children perceive the medium and the situation, mothers choose to let the children have full access to the computer, while they often remain beside or behind them. This arrangement generated a

role division in which the child played on a computer while the mother observed the game. Since mothers had almost no impact on how the game unfolded, they did not exhibit maternal scaffolding during the first stage of the interaction. However, the mothers' passive role in the first stage subsequently led them to attempt to become more involved in the game, which led to a struggle between the mother and child (second stage). This struggle was usually resolved through different forms of sharing and inclusion adopted by the dyads (third stage), allowing mothers to exhibit some maternal scaffolding when the children allowed them to be more engaged in the situation. When possible, mothers engaged mainly in affective scaffolding (Yelland and Masters, 2007), both verbal and physical (Wood et al., 2016).

This dynamic indicates that the medium has a strong impact on maternal scaffolding at both levels. The first relates to the properties of the medium, particularly the extent to which it is suitable for use by two people. The second level is mothers' perceptions of their own competency, skills, and expertise in the medium and their interest in playing computer games. The study demonstrates that, in situations where the mother feels that she does not possess the proficiency needed to lead the task and has no added value to offer to play the game, most find it difficult to support their children through scaffolding. Notably, although some mothers used the situation to teach their children skills and competencies (e.g., coping with frustration, developing independence, and assertiveness), this does not amount to maternal scaffolding regarding the task, as is traditional in models of parental scaffolding in other contexts (Mermelshtine, 2017; Wood and Middleton, 1975; Wood et al., 1976, 2016).

The study demonstrates that when children are more skillful in mother-child interactions (or they feel they are more skillful), they do not engage in scaffolding and, in most cases, do not try to support their mothers. It is possible that this behavior stems from the characteristics of the specific medium; however, this has not yet been confirmed. This finding is interesting in light of studies showing that this type of mutual help exists in children's joint play; that is, children engage in scaffolding and support other children (Ewin et al., 2021; Mermelshtine, 2017). Future studies should investigate the situations in which children support their parents.

This study contributes a novel perspective on parental scaffolding by asserting that maternal scaffolding and supporting the child require one basic condition, that the mother has a sense of confidence, competence, and self-efficacy. As parental scaffolding is highly important for child development (see for example Basilio and Rodríguez, 2017; Ewin et al., 2021), it is essential to understand the conditions under which it occurs.

This study had some limitations. First, the children's group included both sexes; however, the adult participants included only mothers. Although the researchers reached out to both fathers and mothers, as in other studies, only mothers participated (e.g., Davison et al., 2017). This limits the generalizability of the current findings because the father-child dynamic while playing a computer game may differ from the mother-child dynamic, indicating an avenue for future research. Similarly, this study did not examine situations in which children played computer games with other people in their lives, such as siblings, grandparents, or peers. This raises the question of whether a similar dynamic to that described in this study would emerge in these cases. For example, would the same pattern manifest when a young child plays with an older sibling? This topic, although indirectly

referred to in some of the interviews, was not explored formally in this research but is worthy of examination in the future. Another limitation is the participant recruitment method. Because the participants were recruited using snowball sampling, they cannot be considered a representative sample. Future research building upon this study may consider employing representative sampling methods.

In conclusion, this study examined a topic that has not received sufficient research attention: maternal scaffolding while playing computer games with school-aged children. In this study, we proposed an original model. As technology advances and children adapt to technological innovations and new media (for leisure and educational purposes), it is important to examine their interactions from novel perspectives such as those suggested in this study.

## Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

## Ethics statement

The studies involving humans were approved by the Ethics Committee of The Max Stern Yezreel Valley College. The studies were conducted in accordance with the local legislation and institutional requirements. Written informed consent for participation in this study was provided by the participants' legal guardians/next of kin.

## Author contributions

MA: Conceptualization, Formal analysis, Investigation, Methodology, Writing – original draft, Writing – review & editing. DB: Conceptualization, Formal analysis, Investigation, Methodology, Writing – original draft, Writing – review & editing.

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