

Material Selection in Observational Assessment of Maternal Sensitivity

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What is already known about this topic?

- *Maternal sensitivity is a critical factor in children's social, emotional, and cognitive development.*
- *Play is an effective tool for observing mother-child interaction in a natural setting.*
- *The type of material directly affects the observability of relational behaviors such as maternal sensitivity.*

What does this study contribute to the literature?

- *It provides experimental evidence that playdough enables more natural and comprehensive observation of sensitivity behaviors.*
- *A within-subjects design was used, allowing the same mothers to be observed with two different materials.*
- *Artificial intelligence-assisted content analysis offers an innovative methodological contribution to observational data analysis in social sciences.*

Abstract

This study examines whether playdough or building blocks offer a more appropriate framework for assessing maternal sensitivity during interactive play between mother and child. A qualitatively-oriented mixed methods approach (QUAL + quan) was employed to analyze 48 video-recorded play sessions involving 24 mother-child dyads, with each dyad participating in both material conditions. Content and descriptive analyses were conducted across seven behavioral categories. The coding procedure involved two trained human coders and an artificial intelligence-assisted tool, with inter-coder reliability assessed using Cohen's Kappa. A within-subjects design enhanced internal validity, and the Wilcoxon test was used for statistical comparisons. Quantitative findings showed that playdough yielded significantly higher scores across multiple dimensions of maternal sensitivity. Qualitative results further illuminated these differences, demonstrating that open-ended materials enhanced the authenticity and variability of interactions. The findings suggest that open-ended play materials offer a more ecologically valid and context-sensitive basis for observing relational behaviors such as maternal sensitivity, highlighting the methodological significance of material selection.

Keywords: Building blocks, maternal sensitivity, mother-child interaction, open-ended material, play-based observation, playdough

Introduction

Play is essential for the social, cognitive, and emotional development of children (Brooker, 2017; Goldstein, 1994). Through play, children explore their environment and develop skills in self-expression, problem-solving, and creative thinking. Research robustly corroborates this viewpoint. Göncü and Gaskins (2007) and Fisher (1992) have shown that children's play enhances cognitive flexibility, creativity, and problem-solving skills. These developmental processes are enhanced through caregiver interactions. Vygotsky's (1978) Social Development Theory posits that children's development is primarily influenced by social interactions, especially with adult supervision. Mothers play a crucial part in play by directing and reacting to their children's actions. Leong and Bodrova (2012) highlighted that guiding during play enhances learning experiences and bolsters children's creative thinking, problem-solving skills, and collaboration capacities.

Research has thoroughly investigated the impact of various play materials on parent-child interactions (Dungan et al., 2023; Thompson et al., 2024; Wu et al., 2024). Open-ended materials enhance children's creative autonomy and expression, prompting mothers to assume a more supportive and less intrusive role (Hopma et al., 2009; Kärtner & von Suchodoletz, 2021; Sung, 2018). Conversely, structured materials typically direct children's engagement in specific manners, often resulting in mothers adopting more directive and controlling strategies (Sung, 2018; Wooldridge & Shapka, 2012). The type of material significantly influences interaction dynamics and may affect maternal sensitivity (Schneider et al., 2022).

Maternal sensitivity, a crucial factor in child development, refers to a mother's ability to precisely identify and promptly address her child's needs while offering emotional support when required (Ainsworth et al., 1978; Juffer et al., 2008). Research demonstrates that maternal sensitivity enhances children's cognitive and social development. Dryer et al. (2022) underlined its importance in cognitive function development, whereas Hurtado-Mazeyra et al. (2022) found that early maternal sensitivity in Peru forecasted cognitive and social outcomes. Ainsworth et al. (1978) highlighted maternal sensitivity as crucial for the formation of secure attachment and good emotional development. Stern et al. (2022) shown its association with the recognition of positive emotions, which influences parent-child interactions. In addition, Copeland et al. (2022) demonstrated the substantial impact of maternal sensitivity on the functional brain connectivity in offspring.

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Q2 Studies such as Shokoufefdard et al. (2019) and Hurtado-Mazeyra et al. (2022) continuously underscore the significance of play materials as effective instruments for evaluating maternal sensitivity and child development. Open-ended materials are particularly esteemed for stimulating creative processes (Çelebi Öncü, 2015; Thompson et al., 2024; Wu et al., 2024). Fink et al. (2023) identified that vocalizations were crucial in assessing maternal sensitivity. Likewise, Çelebi Öncü (2015) underscored the efficacy of unstructured materials in fostering innovative thinking. Thepsuthammarat et al. (2012) illustrated the cognitive advantages of natural and creative materials.

The influence of organized and open-ended play materials on mother-child contact has been examined from various perspectives, including material type, maternal style, child features, and cultural context (Rochanavibhata & Marian, 2022; Sutton-Smith, 1997). Structured materials enhance mother engagement in problem-solving, highlighting many dimensions of maternal sensitivity (Çelebi Öncü & Unluer, 2010; Stern & Hertel, 2022). Stern and Hertel (2022) contended that increased tool-intensive interactions may diminish metacognitive activity, while fewer, less organized materials foster autonomy and enhance metacognitive development. In contrast, Bleumers et al. (2015) highlighted parental perceptions about play surroundings and instruments.

Rochanavibhata and Marian (2022) revealed distinct cultural differences in how American and Thai mothers structure play activities. Maternal sensitivity can be assessed through observed actions, with play materials acting as effective instruments in this evaluative process (Dungan et al., 2023; Juffer et al., 2008; Seven & Alabay, 2020). Observing mother-child play sessions yields authentic and significant information, rather than depending on interviews or scales (Seven & Alabay, 2020). Play establishes a natural environment for these evaluations, rendering play materials crucial tools for assessing maternal sensitivity (Howes & Smith, 1995; Seven & Alabay, 2020; Wu et al., 2024). Open-ended materials like playdough offer significant opportunities to evaluate maternal sensitivity and children's creative expression (Thompson et al., 2024). The study by Howes and Smith (1995) indicated that playdough promotes emotional security and autonomy, leading to improved parent-child interactions. These products provide children with the liberty of expression while fostering more active parental engagement. Seven and Alabay (2020) revealed that

playdough fosters creativity while facilitating the observation of maternal supervision. Wu et al. (2024) discovered that open-ended materials such as playdough allow children of differing ages to exhibit creativity and problem-solving abilities, rendering them effective evaluation instruments.

Research Objective

This study compares two types of play materials—open-ended playdough and structured building blocks—to see whether one enables a more effective assessment of maternal sensitivity during mother-child play interactions. The findings aim to direct future study by determining which material is more effective for evaluating maternal sensitivity via observation.

Investigative Inquiries

- Are there significant differences in the observed sensitivity-related behavioral scores when comparing playdough vs. building blocks?
- How do structured (building blocks) and open-ended (playdough) materials influence mothers' ability to demonstrate sensitive behaviors during interactions?

Methods

Research Design

This study examined whether playdough or building blocks provide an optimal setting for evaluating maternal sensitivity during mother-child interactive play sessions. A systematic strategy was utilized to meticulously evaluate observational data and compare the materials for their efficacy in enhancing observation. This study utilized a Qualitatively-Driven Mixed Methods Design (Morse & Niehaus, 2009). The principal element involved qualitative data analysis, encompassing video-recorded observations of mother-child interactions in authentic home environments. Quantitative analytical methods were utilized to improve the arrangement and comparability of observational data (Morse & Niehaus, 2009). This mixed methods approach was employed to maintain the depth of qualitative observational data while facilitating systematic comparison.

A literature evaluation in the first phase of the study revealed seven main behavioral patterns linked with maternal sensitivity (Biringen, 2000; Bornstein & Tamis-LeMonda, 2010). A comprehensive classification

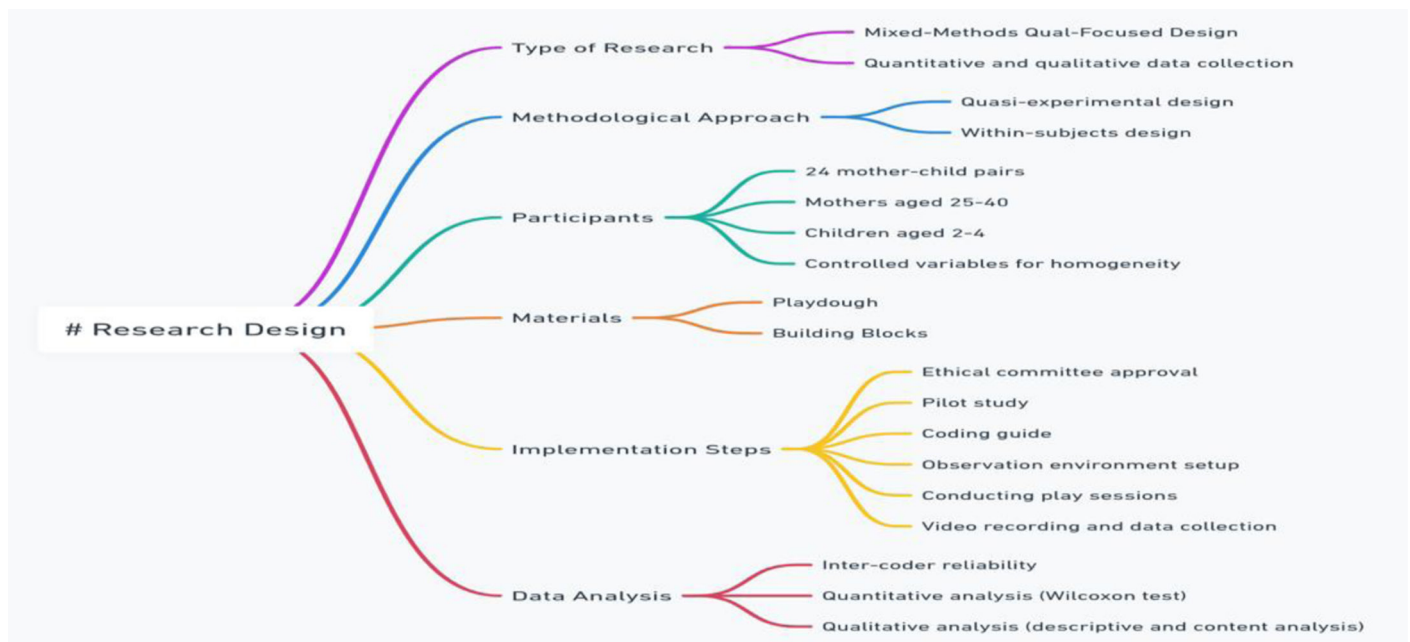


Figure 1.
Mind Map Representation of Research Design.

system was established based on these categories; thereafter, content analysis was systematically employed to scrutinize mother-child interaction recordings. Two separate coders conducted the preliminary coding and subsequently employed a consensus method to finalize the codes. A system augmented by artificial intelligence (AI) enhanced this procedure to elevate the precision of analysis (Yan et al., 2024). The frequencies resulting from the coded data were investigated under two play material conditions—organized (construction blocks) and open-ended (playdough)—to evaluate how well each environment supported the observation of mother sensitivity behaviors. This phase highlights the intersection of methodological integration and quantitative comparison, thereby enhancing the qualitative content analysis. Despite lacking an experimental framework, the study employed a within-subjects approach to observe the same individuals in various settings. This approach decreased inter-subject variability and helped to direct the comparison of the effects of the materials on maternal behavior. Research aiming to discriminate behavioral variance in response to different contextual variables (Welsh & Chatfield, 2022) would find especially suitable within-subject designs. So, the study came up with a way to compare things that takes into account differences in context even when there is no experimental control, random assignment, or intervention.

The observational dataset comprised 48 video sessions recorded with 24 mother-child pairs. In qualitative research, the emphasis is placed on data richness and the contextual depth of observed interactions rather than on high sample sizes; therefore, this sample size was considered enough to achieve the study's objectives (Creswell, 2009; Gravetter et al., 2015; Patton, 2002). The within-subjects strategy, which assessed the same participants through two distinct methods, facilitated robust comparisons despite a limited sample size (Welsh & Chatfield, 2022). In the concluding phase, the results of the content analysis were further detailed by descriptive analysis. Each behavioral theme detailed the observational data for the utilized items. This strategy enabled comprehensive assessments of the variations in maternal sensitivity behaviors across various play contexts. The integration of qualitative findings with frequency data established a systematic method for comparison and demonstrated that the results transcended just observational inferences.

Participants

Forty-eight individuals in all, 24 mothers and 24 children, all native Turkish speakers living in Eastern Türkiye made up the study participants. Particular control variables were set to ensure a homogeneous group. Among the control variables were mothers' age, degree of education, and socioeconomic level. The age range was limited to 25–40, and care was taken to include mothers with similar educational levels. Additionally, selecting participants from middle socioeconomic status served as a control variable to limit the impact of socioeconomic conditions on interaction behaviors. Children's age range was from 2 to 4 years. This age range is a crucial stage when children's social, motor, and cognitive development accelerates (Berk, 2013). Children in this age range were chosen to eliminate possible variances resulting from age differences. Moreover, children in this age range have more interaction demands and supervision requirements, which can directly affect mothers' behaviors during this process. Mothers' capacity to exhibit sensitivity to children's developing needs, offer direction, and foster cooperation is more evident in interactions with 2–4 year olds (Bornstein & Tamis-LeMonda, 2010). In this context, having children in this age group can encourage mothers to take on a more supportive and active role during interactions. The participating children were selected to maintain gender balance, with 12 girls and 12 boys in the sample. This helps control for the effect of gender on mother-child interactions.

Using a purposive sampling strategy, mothers who actively participated in play interactions were selected in line with the study's objectives. This selection enabled the observation of mother-child interactions in a natural setting and facilitated the emergence of maternal sensitivity and guidance skills. Furthermore included in the study were only children without developmental problems in order to reduce the effect of developmental variations on outcomes. In this qualitatively-oriented study, sample size was subordinated to the depth and contextual richness of observational data acquired from every participant (Creswell, 2009; Patton, 2002).

In this study, a semi-structured play environment was designed to observe maternal sensitivity during interactive play between mother

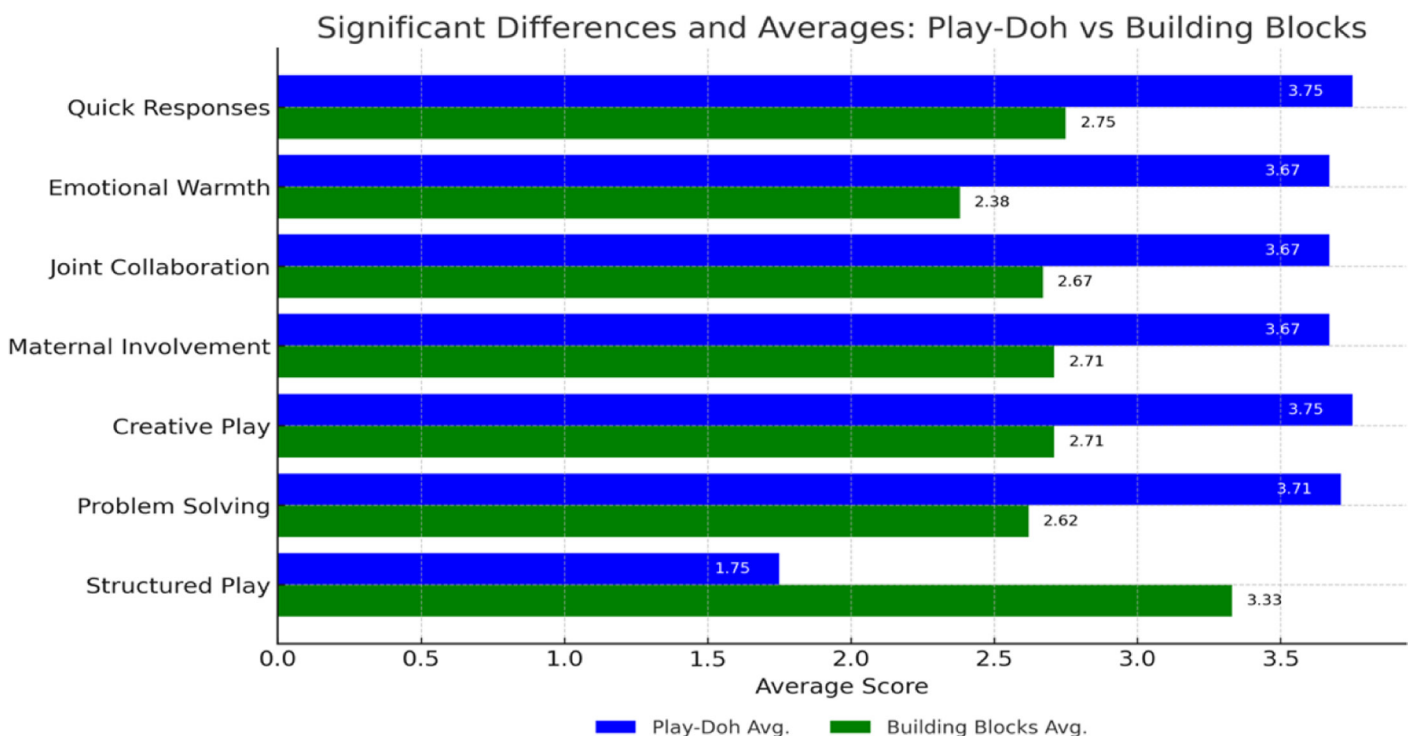


Figure 2.
Average Scores of Play-doh and Building Blocks.

and child, using two different play materials: playdough and building blocks. These materials, chosen in accordance with the study's objectives, were believed to have the potential to reveal different aspects of mothers' sensitivity behaviors during interaction (Çelebi Öncü & Unluer, 2010; Goldstein, 1994). Building blocks give a chance to see mothers' guiding and constructing behaviors through a more structured type of play, whereas playdough provides an open-ended framework that fosters children's creativity and cooperative problem-solving (Hopma et al., 2009).

No additional toys, commands or guiding elements were used besides these materials. Standard playdough consisting of four different colors, each weighing 100 grams, was used; playdough molds or shaping tools were not allowed. The building blocks set was selected as a standard set made of plastic, with modular and connectable features, age-appropriate for children, consisting of 145 pieces, colorful, and medium-sized. All participants were given the same type of unopened and first-time-use playdough and building block sets to ensure equal conditions for everyone at the start of the experience.

Implementation Steps

Ethics Committee Approval and Participant Consent

It was approved in the meeting of the Ethics Committee of İstanbul Esenyurt University University held on February 13, 2025, with decision number 22 taken in session 2025/01, and it was unanimously concluded that the study is ethically appropriate. Parents for every mother-child pair engaged in the study signed informed consent and voluntary participation permission. Participants were also advised of their right to withdraw from the study at any moment and of the research method, confidentiality rules, and that the data would be used solely for scientific purposes.

Pilot Implementation and Standardization

Four mother-child couples carried out a pilot study before the data collection process to ensure consistency of the implementation process. This application provided guidance in terms of arranging the observation environment, determining the duration, and evaluating the functionality of the observation form. The implementation duration and observation recording framework were optimized considering the minor adjustments required during the pilot implementation. Pilot data was used solely for standardization purposes and was not included in the main study analysis.

Design of the Coding Manual

The coding manual was prepared in seven fundamental categories determined by examining relevant literature and theoretical framework to systematically evaluate maternal sensitivity behaviors: Quick and Appropriate Responses, Emotional Warmth, Joint Cooperation, Mother's Participation Level, Creative Play, Problem Solving, and Structured Play. These categories encompass the sensitivity behaviors intended to be observed in mother-child interaction in accordance with the study's objectives.

To ensure content validity of the coding manual, relevant literature was reviewed while establishing behavioral categories for maternal sensitivity, and the draft guide was presented to five expert academics in the field. Category definitions were reviewed and criteria were revised based on expert feedback. This process contributed to structuring the guide based on theoretical foundations and in line with its purpose (Biringen, 2000; Creswell, 2009).

During the implementation process of the coding manual, data reliability was ensured through scoring procedures performed by two independent coders. Independent scoring was conducted for each category,

followed by reviewing coding consistency through comparisons, and final codes were determined through consensus. This approach contributed to ensuring inter-coder reliability, which is one of the important indicators of reliability in qualitative analysis (Patton, 2002; Guest et al., 2011).

In the coding process, the mother's behaviors in interactions were rated between 0 and 4 for each category. This scoring key was developed and revised in line with expert opinions to objectively evaluate the level of observed behaviors.

Determining and Planning the Observation Environment

In this study, the observation process was conducted in the natural home environment where mothers and children felt most comfortable. Each implementation took place in the room where the child spent most time and was most prone to interaction; mother and child were positioned so they could easily see each other and the researcher. This ensured that observations were conducted during the time period when children were most alert and open to interaction. Visits were scheduled at appropriate times, taking into account each child's daily routine and avoiding nap times and mealtimes. This approach allowed observation of the children when they were most energetic and ready to play with their mothers.

Implementation Methodology

In the study, each mother-child pair interacted with two different play materials during separate times. To observe interactions without disrupting their natural flow, sessions were conducted in a semi-structured environment, with mothers receiving only an open-ended instruction before the session: "You can play naturally with your child using this material." During implementation, researchers maintained a passive observer role without any intervention. All sessions were video recorded for later analysis. To support the comparative observation structure and control for material order effects, participants were randomly divided into two groups. Twelve mother-child pairs started with building blocks, while the other twelve pairs started with playdough. A comparative observation method was employed to enhance internal validity (Field, 2018; Welsh & Chatfield, 2022). Each play session was restricted to 10 minutes. This period establishes a developmentally appropriate limit for the attention span of children aged 2–4 years (Berk, 2013) and is advised as a suitable time frame for collecting enough data in comparable qualitative observation studies (Biringen, 2000; Schneider et al., 2022).

Data Collection Process

During play sessions, mother-child interactions were video recorded with participants' consent. The camera recording was conducted by the researcher. The obtained video recordings were thoroughly transcribed by the researcher to form the basis for the analysis process. The transcripts included not only verbal expressions but also behavioral responses, gestures, and facial expressions observed during interactions. This allowed for both linguistic and behavioral data to be analyzed holistically during the coding process.

Following the preparation of transcripts, a member checking process was conducted with participating mothers. During this process, each mother was presented with a transcript sample of her interaction, and necessary adjustments were made to the texts based on feedback received from mothers. This practice is one of the fundamental strategies recommended to enhance data credibility in qualitative research (Creswell, 2009; Lincoln & Guba, 1985).

Data Analysis

In this study, both qualitative and quantitative analysis techniques were used together in the data analysis process, following a

mixed-method approach. The data obtained during the coding process was systematically analyzed to evaluate maternal sensitivity behavioral patterns in the context of different materials.

Inter-rater Reliability

This research employed two independent human coders to assess inter-rater agreement. Each coder independently analyzed the video recordings, assigning points across seven behavioral categories. The Cohen’s Kappa coefficient was used to evaluate the consistency of their assessments. The reliability among coders is essential for ensuring the methodological integrity of the research (Gisev et al., 2013).

The investigation was strengthened by integrating an AI-assisted system (Google AI Studio) and juxtaposing its outcomes with those of the human coders. It’s worth noting that when working with AI systems, such comparisons should be considered measures of inter-tool consistency rather than traditional inter-rater reliability (Yan et al., 2024). Therefore, the final analysis presents both the human coder reliability metrics and the AI-tool consistency measures in parallel (Gisev et al., 2013).

Quantitative Data Analysis

To analyze the quantitative data, the Wilcoxon signed-rank test was employed to determine if mothers and children interacted differently when using building blocks vs. playdough. This non-parametric test was selected specifically because of the modest sample size and the ordinal structure of the collected data (Field, 2018).

For the analysis, each mother’s performance was meticulously evaluated across seven distinct behavioral categories: Quick and Appropriate Responses, Emotional Warmth, Joint Cooperation, Mother’s Level of Engagement, Creative Play, Problem Solving, and Structured Play. The scores in both the building blocks and playdough scenarios were compared, maintaining a significance threshold of $p < .05$. Through this rigorous statistical approach, the aim was to quantifiably demonstrate how effectively each material facilitated the observation of sensitivity behaviors.

Qualitative Data Analysis

In the qualitative analysis, content and descriptive analysis methods were applied based on seven predetermined behavior categories derived from literature. Data transcribed from video recordings were analyzed by two independent coders, followed by final coding completion through consensus between the researcher and coders. The process was also supported by an AI-assisted content analysis tool (Google AI Studio) capable of processing large datasets to enhance the systematicity of the analysis process. In this context, AI was used as a supportive tool that assists researcher decisions but is not the final interpreter. Literature suggests that such AI-assisted analysis systems can be effectively used as a supportive tool in content analysis processes in social sciences (Reis et al., 2024).

In the content analysis, each interaction was systematically analyzed according to categories. Subsequently, observational data was explained through descriptive analysis, comparing mothers’ behavioral examples under each category based on materials. This analysis process was conducted through pre-structured theoretical categories without generating any new themes (Guest et al., 2011; Braun & Clarke, 2006). This structure enabled a comparative evaluation of the opportunities different play materials provide for observing maternal sensitivity behaviors.

Findings

The research findings are presented in three sections: inter-rater reliability, quantitative findings, and qualitative findings.

Table 1.
Wilcoxon Test Results for Playdough and Building Blocks Scores

Category	Mean	SD	Mean	SD	Wilcoxon W	p
Quick responses	3.75	0.44	2.75	0.61	21.00	<.05
Emotional warmth	3.67	0.48	2.38	0.65	12.00	<.05
Joint collaboration	3.67	0.48	2.67	0.64	17.00	<.05
Maternal involvement	3.67	0.48	2.71	0.62	16.00	<.05
Creative play	3.75	0.44	2.71	0.62	20.00	<.05
Problem solving	3.71	0.46	2.62	0.65	19.00	<.05
Structured play	1.75	0.64	3.33	0.79	18.00	<.05

Inter-Rater Reliability

The reliability of the video-coded data was evaluated by comparing the assessments of two independent human coders using Cohen’s Kappa coefficient (Landis & Koch, 1977). The results indicated a Kappa value of 0.80 for playdough sessions and 0.67 for building block sessions. According to Hallgren (2012) and McHugh (2012), these figures represent high and moderate levels of inter-rater agreement, respectively.

Additionally, coding consistency was examined between the human coders and the AI-assisted content analysis tool (Google AI Studio). The Kappa values for human-AI agreement ranged from 0.67 to 0.78, indicating substantial inter-tool consistency. These findings suggest that the coding process was both reliable and systematically consistent, with strong alignment between human judgment and AI-supported analysis.

Quantitative Findings

The study used the Wilcoxon signed-rank test to compare the maternal sensitivity behaviors observed during playdough and building block sessions. The analysis revealed statistically significant differences across all seven behavioral categories ($p < .05$). The table below summarizes the mean scores, standard deviations, test statistics, and p values for each category.

The results demonstrate that playdough elicited higher scores in six of the seven categories—particularly those associated with responsiveness, warmth, collaboration, involvement, creativity, and problem-solving. In contrast, building blocks scored higher only in the Structured Play category, reflecting its directive nature.

These findings indicate that open-ended materials like playdough provide a richer context for observing maternal sensitivity behaviors, while structured materials support more controlled and goal-oriented interaction.

Qualitative Findings

In this section, qualitative findings obtained across seven sensitivity categories were analyzed separately for each play material.

Quick and Appropriate Responses

This measures how quickly and appropriately mothers respond to their child’s initiated interactions, questions, needs, and emotional expressions. Under this theme, the mother’s speed in following the child’s actions, the age and developmental appropriateness of their responses, verbal and non-verbal communication skills, and approaches that support the child’s autonomy were examined. When comparing building blocks and playdough sessions, the flexible nature of playdough allowed children to display different needs and expectations during play. While some mothers gave quick and appropriate responses to their children’s signals and needs, others failed to notice their child’s signals and gave inappropriate responses. This situation is important for measuring maternal sensitivity. When using building blocks, mothers were observed to give more planned and structured responses. Due to the structured nature of building blocks limiting the

emergence of different needs during play, it remained limited in measuring maternal sensitivity.

During building block sessions, children mainly asked for help when they couldn't connect the blocks. For instance, C1 said, "Mom, this was ineffective," seeking help. M1 quickly responded, "Very well, if we position this here, it will function." C18 said, "This piece is incompatible," and M18 responded promptly with, "Alright, let us attempt with another piece." During playdough sessions, children needed help in different ways. C2 and C21 couldn't open the playdough container and said, "Mom, I cannot open it" and "It will not open." M2 quickly replied, "I can open it; I can assist you." Some mothers noticed their children struggling with containers and offered help before being asked, saying things like "I can assist you in opening it" or "let's open it together if you wish." C1, C3, and C11 felt uncomfortable when playdough stuck to their hands. When C11 showed discomfort by looking at their hands, M11 quickly noticed, cleaned the child's hands with a tissue, and encouraged them to continue playing. C3 said, "Mom, observe, the dough has adhered to my hand in this manner." M3 responded reassuringly, "It's alright, do not be concerned" and helped keep the play going.

Many children shared observations about their creations. C4 said, "Mom, it resembles Spider-Man's arm," to which M4 responded enthusiastically, "Oh, truly? It appears to resemble Spider-Man's arm," while engaging actively in play. However, some mothers were less responsive. When C17 said, "Mom, I will place my meatballs here; could you prepare a pot?" and repeated the request, their mother remained silent. Similarly, when C20 asked for help—"Mom, this isn't functioning, what should I do?"—M20 merely responded with a dismissive "uh-huh."

Emotional Warmth

This encompasses expressions of love, affection, support, and acceptance in mothers' interactions with their children. Under this theme, behaviors such as smiling, praise, approval, encouragement, physical contact, and understanding the child's emotions were examined.

When comparing building blocks and playdough sessions, the flexible and sensory nature of playdough allowed children to engage in sensory exploration while revealing whether mothers noticed and accompanied this process. The more structured and goal-oriented nature of building blocks limited the depth and variety of emotional interaction.

During building block sessions, mothers' expressions of emotional warmth typically focused on the child's achievements, constructions, and play skills. Praise like "Well done!", "You did that beautifully!", confirmations like "Yes, exactly like that!", and encouragements like "You're doing great!" were frequently used. For example, in the M-C-9 pair's building blocks session, while praising the child's construction with "Oh, that's beautiful!", the mother also guided them to the next step "Now let's make the roof." In playdough sessions, mothers' expressions of emotional warmth were more diverse and focused on the child's emotional world. It provided an environment for children to play freely with playdough, experimenting with different shapes and colors. Mothers showed understanding and acceptance of children's emotions with expressions like "Are you sad?", "It might be a bit difficult, but you'll manage." For instance, in the M-C-4 pair's playdough session, when C4 became disappointed about not being able to make the desired shape, M4 offered emotional support and encouragement, saying, "Don't worry, you can try again. I can help you if you'd like." Additionally, the tactile and sensory properties of playdough enabled mother-child pairs to get excited together. For example, when C9 opened the playdough and held it, they became very excited about its soft texture and laughed out loud. M9 responded by laughing along,

showing emotional synchrony. It allowed mothers to establish more physical contact (hugging, caressing, kissing) and emotional closeness with their children. Unlike M9, M17 failed to notice her child's excitement and happiness while touching the playdough, saying, "Yes, now what shall we make with this dough?" and tried to take the dough from the child's hands. C17 pulled the dough toward themselves, not wanting to give it to their mother, just wanting to knead it for tactile pleasure. The mother repeated this behavior many times until the end of the play, causing anxiety in the child.

Joint Collaboration

This reflects the mother and child's mutual participation in the play process, their interaction, and the value they place on each other's ideas. Under this theme, behaviors such as making decisions together about play, exchanging ideas, considering each other's suggestions, and working together toward a common goal were examined.

When comparing building blocks and playdough sessions, playdough created a more egalitarian, reciprocal, and creative collaboration environment between mother and child. While the flexible nature of playdough allowed children to participate more actively in the play process and freely express their ideas, it also enabled mothers to take either a supportive or disruptive role in children's creativity and problem-solving skills. In building blocks sessions, joint collaboration typically occurred through the mother's guidance and the child's compliance with these directions. The structured nature of the play limited the diversity of ideas and the scope and quality of joint collaboration.

During building blocks sessions, mothers set a construction goal at the beginning like "Shall we make a house?", "Now let's build a tower" and children followed their mothers' instructions to achieve this goal. Collaboration mostly focused on technical aspects such as selecting, combining, and placing pieces. Children had limited opportunities to present their own ideas and suggestions, with mothers usually maintaining control of the play. For example, M5 initiated the play by saying "Let's make a house, okay. Come on, let's make a house together" and constantly intervened in C5's piece placements with "You put one too", "This one, this." In playdough sessions, children participated more actively in decisions about which colors to use, which shapes to make, and how the play would progress. For instance, in the M-C-8 pair, the mother asked "Which color would you like to play with?" allowing the child to make their own choice and showed openness to collaboration by saying "Let me help you too." In this session, the child's excited expressions and the mother's supportive responses reflected the positive environment created by joint collaboration. However, in some mother-child pairs, disruptive maternal behaviors were observed. For example, in the M-C10 pair's playdough session, when the mother asked what they should make, the child responded "let's make a house with a garden and stairs, and put children in the garden." Although M10 agreed, she made the house herself and constantly criticized what the child made with expressions like "what does this look like," "its head is too big," "where are the eyes, hands." She then destroyed the figure the child made and remade it herself.

Maternal Involvement

Maternal involvement refers to how actively and meaningfully the mother participates in the play process. Under this theme, the forms of verbal and physical support provided by the mother—such as guidance, explanation, modeling, playing together, participating in the child's play, and supporting the child's autonomy—were examined.

Maternal involvement in playdough sessions enhanced children's autonomy and creativity while offering essential supervision and emotional support, in contrast to building blocks activities. Furthermore, playdough activities fostered an environment more conducive to the

child's developmental requirements, enabling a more thorough assessment of maternal sensitivity. During building blocks sessions, maternal involvement predominantly emphasized the rules and objectives of the play, thus constraining children's opportunities for independent discovery and experiential learning through trial and error.

During building block sessions, maternal involvement predominantly centered on the construction process and exhibited a more directive approach. Mothers provided guidance on the assembly of components, specified the structures to be constructed, rectified erroneous placements, and guaranteed compliance with the game regulations. Although these instructions aided children in comprehending the structural characteristics of building blocks and the game's rationale, they occasionally constrained children's chances to make independent discoveries and learn via experimentation.

For example, in the MC-4 pair's building blocks session, when the mother saw the child struggling to connect pieces, she intervened saying "Put this here, look, it should be like this" and demonstrated the correct assembly method. In playdough sessions, however, maternal involvement was more supportive, collaborative, and exploration-focused. Unexpected situations while playing with playdough (such as the dough sticking or shapes getting distorted) provided opportunities for mothers to more clearly demonstrate their problem-solving skills and guidance to their children. For example, in the MC-12 pair's playdough session, the mother showed the child how to make different shapes with playdough, mixed new colors together, and made comments supporting their creativity like "You've made a beautiful flower!", "What else can we make?"

Creative Play

Creative play reflects how children participate in play by using their imagination, originality, and self-expression skills. Under this theme, children's behaviors such as generating new ideas, experimenting with different materials, creating original products, bending game rules, and creating their own play scenarios were examined, along with mothers' responses to these behaviors and how play materials influence creativity.

When comparing building blocks and playdough sessions, playdough provides a flexible and adaptable play environment that allows children to express and explore their creativity more freely. This material enables children to demonstrate their imagination and self-expression skills more comprehensively, better reflecting maternal sensitivity in creative play. Building blocks, on the other hand, provide a more structured and goal-oriented play experience, causing creative expression to remain within certain patterns.

In building blocks sessions, the structured nature of building blocks encouraged children to create concrete structures (house, tower, car, etc.) by combining specific pieces and following certain instructions. This resulted in creative expression being confined within specific patterns and limits. Mothers supported the creative process by praising children's structures and encouraging them to build new ones, but they generally maintained control of the play and provided limited freedom for children to create their own play scenarios. For example, in the MC-2 pair's building blocks session, the mother directed the play by offering options like "Shall we make a house? Or a tower?" limiting the child's creative experiments to a narrow framework. In playdough sessions, however, the unlimited molding possibilities of playdough allowed children to use their imagination more freely and bring any object, character, or scenario to life. While playing with playdough, children mixed different colors, experimented with textures, and created their own unique products. Mothers took on a supportive role in this process, making comments that showed they valued their children's ideas: "That's a very interesting shape!", "Can you tell me about

it?" and encouraged them to explore more. For example, in the MC-14 pair's playdough session, while the child was creating different figures from playdough like stick figures, Spider-Man, and dolls, their mother used expressions that supported creativity: "That looks great!", "What else can you make?" and gave them more freedom. In the MC24 pair, when C24 said, "I want to make an amazing elephant," the mother responded, "But elephants are grey and we don't have grey." The child then suggested, "I have a super idea, let's make a nice camera," but the mother again replied, "But we don't have black and cameras are black." In this case, C24 had to give up and follow the mother's plan instead.

Problem Solving

This section analyzes the tactics children utilize when encountering obstacles during play, the assistance provided by mothers in this process, and the impact of play materials on the application of problem-solving abilities. In comparing building blocks and playdough sessions, playdough provides greater possibilities for children to utilize and enhance their problem-solving abilities, with mothers assuming a more supportive and directing role. In building blocks sessions, mothers' directive approach constrains children's abilities to devise their solutions and learn via trial and error. In building block sessions, the issues faced are generally structural and technical. Children have challenges such as locating the appropriate component, interlocking pieces, preserving structural integrity, or forming intended shapes. Mothers typically use a prescriptive and solution-oriented strategy to address these difficulties. They advise children on the appropriate placement of parts, rectify errors, and offer sequential guidance for completing the building. This strategy aids children in comprehending the structural qualities of building blocks and game rules, although it constrains their abilities to devise their solutions and engage in trial and error learning. In the MC-6 pair's building blocks session, when C6 encountered difficulties in connecting the blocks, M6 responded, stating, "But it doesn't function in that manner." He next stated, "Let us position the blocks here; let us proceed in this manner," and clearly illustrated the solution. The issues faced during playdough sessions primarily pertain to the qualities of the substance and the creativity of the children. Children experience difficulties such as playdough sticking, shapes deforming, colors mixing, or inability to create fine details as desired. Mothers' awareness of these problems and their more supportive, collaborative, and exploration-focused approach provide insight into maternal sensitivity. For example, when M3 noticed C3 struggling to roll the dough, she slowly rolled the dough in her hands and said, "Look, you need to move your hands like this," showing awareness of her child's motor skills while providing a solution.

Structured Play

This is a type of play that occurs inside defined rules, goals, or constraints and generally unfolds under adult supervision. This theme involved an analysis of maternal rules for play, directives given to children, methods of controlling the dynamics and substance of play, children's adaptability to this framework, and the influence of play items on structured play.

In comparing building blocks and playdough sessions, building blocks give a more regulated play setting, while playdough facilitates a more flexible and exploratory play experience. Building blocks emphasize mothers' mentorship and problem-solving capabilities, but playdough more accurately represents mothers' proficiency in fostering children's creativity and independence.

In building blocks sessions, structured play was more goal-oriented and product-focused. Mothers typically set a construction goal at the beginning of play (such as building a house, tower, or car), and children followed their mothers' instructions and guidance to achieve this

goal. The unique building pieces and assembly rules of building blocks naturally contributed to the structured progression of play. Mothers' participation mostly involved guiding children, helping with piece selection and assembly, correcting mistakes, and ensuring the structure was completed as intended. For example, in the MC-7 pair's building blocks session, the mother set the game's objective by asking "Let's build a house. How shall we build the house?" and guided the child in placing structural elements (window, door, tree).

In playdough sessions, structured play occurred in a more flexible and process-oriented way. The unlimited molding possibilities of playdough provided children with more freedom and room for exploration. For example, C23 suggested "mom, let's make a birthday cake together," and C19 said "let's make pizza for dinner." While the MC22 pair was making a rainbow, C22 noticed their shape looked like a flower and said "it turned into a beautiful flower, let's make a flower garden." M22 supported the child by saying "oh yes, it does look like a flower, let's make a flower garden," changing the direction of play.

Discussion

The primary objective of this study was to determine which play material—open-ended playdough or structured building blocks—offers a more appropriate environment for assessing maternal sensitivity. The results indicate that playdough facilitates richer, more natural interactions that reveal the full spectrum of maternal sensitivity behaviors.

The qualitative analysis highlighted that mothers using playdough were more likely to display flexible, responsive, and emotionally attuned behaviors, aligning with previous findings by Hopma et al. (2009), who argued that open-ended materials foster maternal guidance. These findings also resonate with Dryer et al. (2022), who emphasized the role of emotionally supportive play contexts in enhancing children's cognitive and social development. In a similar vein, Fisher (1992) underlined how open-ended materials facilitate divergent thinking and creativity, while Russ and Dillon (2011) demonstrated that imaginative play supports long-term creative abilities. By contrast, mothers using building blocks tended to engage in more directive and task-oriented interactions, limiting the emergence of spontaneous child behaviors. This reflects the findings of Schneider et al. (2022), who found that structured materials may suppress emotional warmth and responsiveness.

The quantitative findings reinforced this pattern, with playdough sessions producing significantly higher maternal scores across six of the seven behavioral categories—especially in areas such as quick and appropriate responses, emotional warmth, creative play, maternal involvement, joint cooperation, and problem-solving. The only category in which building blocks surpassed playdough was Structured Play, consistent with their inherently rule-bound nature. These results align with Wooldridge and Shapka (2012) and Pepler and Ross (1981), who documented how structured materials restrict interactional diversity while open-ended tools support creative thinking and metacognitive development.

Methodologically, this study demonstrates the value of a qualitatively driven mixed methods design, which preserved the richness of video-based interaction data while enabling structured, comparative evaluation through quantitative coding. The within-subjects design increased internal validity by allowing each mother-child dyad to serve as its own control (Welsh & Chatfield, 2022). However, the nonexperimental structure of the study—lacking random assignment and formal intervention—limits causal inference. The findings reflect observational patterns rather than experimentally manipulated effects.

One methodological innovation was the integration of AI-assisted coding through Google AI Studio. While the AI tool provided

consistency and efficiency in pattern detection, it served only as a support mechanism to human interpretation, especially for emotionally nuanced behaviors. As suggested by Yan et al. (2024), AI-assisted content analysis is promising in qualitative social science, but it must remain under human oversight for interpretive reliability.

The findings also offer theoretical implications, particularly within the framework of Vygotsky's (1978) Social Development Theory. Although Vygotsky emphasized adult scaffolding, this study shows that open-ended materials empower both adult and child agency, allowing mothers to provide guidance that is responsive, not prescriptive. This echoes Biringen's (2000) conceptualization of sensitivity as interactionally and contextually shaped, rather than purely dispositional.

Moreover, the research demonstrates that play materials are not neutral tools; they actively shape the interactional space. Open-ended materials invite more authentic and co-constructed experiences, which makes them more suitable for evaluating relational constructs like maternal sensitivity. This also supports Bornstein & Tamis-LeMonda's (2010) argument that caregiver-child relationships are context-dependent and dynamically regulated (Juffer et al., 2008; Rogoff, 1990).

Conclusion

This study employed a qualitatively-driven mixed methods design to investigate how different play materials—specifically, open-ended playdough vs. structured building blocks—affect the observational assessment of maternal sensitivity. The findings revealed substantial differences in how these materials shaped the mother-child interaction context.

Qualitative analysis demonstrated that playdough sessions fostered a richer and more authentic range of maternal sensitivity behaviors. The open-ended nature of playdough allowed children to express diverse emotional and cognitive needs, to which mothers responded more flexibly, promptly, and naturally. These interactions promoted creativity, mutual cooperation, and emotional attunement. In contrast, building block sessions often resulted in more task-oriented, goal-driven maternal behaviors, with reduced opportunity for spontaneous, child-initiated interaction. These patterns were reinforced by the quantitative findings. Mothers scored significantly higher in playdough conditions across all sensitivity-related categories—such as quick and appropriate responses, emotional warmth, creative play, maternal involvement, joint cooperation, and problem-solving. The only category in which building blocks outperformed playdough was Structured Play, highlighting their capacity to support instruction-led, goal-focused interaction.

Overall, the results demonstrate that open-ended materials such as playdough are more effective tools for assessing maternal sensitivity in naturalistic observational settings. They allow for a broader, more nuanced expression of relational behaviors and support the emergence of child-led, emotionally rich interactions. These findings underscore the methodological significance of material selection in observational research. Material properties not only shape the flow and focus of the interaction but also affect the visibility of key behavioral indicators. Therefore, choosing materials that foster spontaneity, creativity, and emotional reciprocity is critical for authentic assessment of maternal sensitivity.

Limitations

Despite its contributions, the study has some limitations. The small sample size (24 dyads) limits generalizability. Additionally, the study focused exclusively on families from a specific socioeconomic and cultural background in Eastern Türkiye. Future cross-cultural research

is necessary to examine how material effects may vary across diverse populations.

A second limitation is the potential for reactivity: knowing they were being observed may have caused some mothers to modify their behavior—a variation of the Hawthorne effect. Although the home setting helped reduce artificiality, complete naturalness cannot be guaranteed.

Third, the study examined only one open-ended material (play-dough) and one structured material (building blocks). Future research could explore other open-ended materials (e.g., sand, clay, art supplies) to assess whether similar patterns hold.

Finally, this study did not control for other factors that may influence maternal sensitivity, such as maternal stress, educational level, or child temperament. Future studies could adopt multivariate models to better account for these interacting influences.

Contributions and Implications

This study makes a unique methodological and theoretical contribution to the literature on maternal sensitivity. It highlights how material selection is not merely technical, but profoundly methodological, influencing the quality and authenticity of observed behavior. The use of open-ended materials, especially in naturalistic settings, offers a more valid and ecologically rich approach to sensitivity assessment.

Recommendation

Practically, the findings can inform early childhood professionals, developmental psychologists, and educators in designing more effective observational tools and intervention programs. By choosing materials that elicit spontaneity, creativity, and mutual responsiveness, practitioners can better assess and support the parent-child relationship.

Data Availability Statement: The data that support the findings of this study are available on request from the corresponding author.

Ethics Committee Approval: Ethical committee approval was received from the Ethics Committee of University of Istanbul Esenyurt (Approval No: 2025/01; Date: February 13, 2025).

Informed Consent: Written informed consent was obtained from participants and the parents of the participants who agreed to take part in the study.

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