



KADIR HAS UNIVERSITY  
SCHOOL OF GRADUATE STUDIES  
DEPARTMENT OF SOCIAL  
SCIENCES AND HUMANITIES  
PROGRAM OF PSYCHOLOGY

**THE ROLE OF SOCIOECONOMIC STATUS AND  
MATERNAL BEHAVIORS IN INFANT EXPLORATION**

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MASTER OF ARTS THESIS

ISTANBUL, JUNE 2025

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Master of Arts Thesis

2025

**THE ROLE OF SOCIOECONOMIC STATUS AND  
MATERNAL BEHAVIORS IN INFANT EXPLORATION**

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Thesis submitted to

the School of Graduate Studies of Kadir Has University

in partial fulfilment of the requirements for the degree of

Department of Social Sciences and Humanities, Master

of Arts in Psychological Sciences

Istanbul, June, 2025

## APPROVAL

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## **DECLARATION ON RESEARCH ETHICS AND PUBLISHING METHODS**

I, DİLARA ÖZALP; hereby declare

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In addition, I acknowledge that any claim of irregularity that may arise in relation to this work will result in a disciplinary action in accordance with the university legislation.

Dilara Özalp

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Date (26/06/2025)

*To My Sister, My Closest Friend and Greatest Supporter...*

## ACKNOWLEDGEMENT

This thesis is a result of a long academic and personal journey. I would like to thank everyone who supported me throughout this process. First and foremost, I would like to thank my advisor, Berna Arslan Uzundağ, for her constant support and patience. Her assistance and encouragement taught me how deeply a supportive advisor can change a student's graduate experience. She has become my biggest role model, and I aspire to be as responsive and supportive as a scholar in the future. I also want to thank the committee members, Hilal H. Şen and Aslı Aktan-Erciyas, for dedicating their time, insightful feedback, and questions.

My sincere thanks go to the Child and Family Research Laboratory. In particular, I would like to thank Nursena Yıldız Koç, Gizem Akel Güçlü, Şüheda Nur Erdoğan, and Özce Sıvış for data collection. Further, I would like to thank the graduate and undergraduate students involved in the data coding. Ardakaan Sönmez, Sueda Buğur, Asena Sayın, and Fatmanur Etili have shown invaluable hard work.

I am incredibly thankful for my exceptionally supportive friends, Esra and Duygu. They have been my constant source of support since we started college. Thank you for answering all my anxious texts about how hard graduate school is with an unwavering "We got this!" Your friendship and shared experiences made me feel less alone in this journey. I also want to thank my childhood friends, Serkan and Gülşen. Although we were on entirely different paths, their friendship and encouragement have always been my source of motivation. My heartfelt thanks to my partner, Berk, who always reminded me to believe in myself. Your steady presence meant more than I can express.

My deepest appreciation goes to my family, Murat, Aliye, and Sıla, who believed in me and supported me in this journey. Above all, I would like to thank my sister. She cheered me and believed in me every step of the way. She has been my anchor and my closest friend. Above all the roles that I had, I loved being your big sister the most. Thank you so much!

# THE ROLE OF SOCIOECONOMIC STATUS AND MATERNAL BEHAVIORS IN INFANT EXPLORATION

## ABSTRACT

Infant exploration lays the foundation of later cognitive development and is associated with infants' problem-solving skills, tool use, and goal-directed behavior. Although some studies report a significant relationship between socioeconomic status (SES) and infant exploration, not all studies support this relationship. The first goal of this study was to investigate the moderating role of maternal behaviors (i.e., maternal encouragement of exploration, responsiveness, and attention-directing/following) in the relationship between SES and infant exploration to explain these contradictory findings. Moreover, while maternal behaviors such as attention-directing/following and responsiveness have been investigated in relation to infant exploratory behavior, the range of examined parental behaviors that might potentially encourage infant exploration is limited. Therefore, the second goal of this study was to create a coding scheme for specific maternal behaviors that may encourage infants to explore and examine the relations between these behaviors and infant exploration. Data were collected from 110 mother-infant dyads in a laboratory setting ( $M(SD)_{\text{infant age}} = 11.9(1.4)$ , age range = 9.7 - 15.9 months). Infant exploration was coded from 6-minute infant solo-play videos, and maternal behaviors were coded from 10-minute mother-infant free-play videos. Results showed that maternal attention-following proportion and directing frequency significantly moderated the relationship between SES and infant exploratory behavior, such that the association between SES and infant exploration was weaker (stronger) at higher levels of maternal attention-following (directing). Within our novel coding scheme for maternal encouragement behaviors, behaviors such as asking stimulating questions and offering novel objects were associated with greater and more complex infant exploration. In sum, this study introduces a new framework for coding maternal behaviors that support exploration and suggests that infants from lower-SES backgrounds may benefit more from maternal attention-following as a compensatory mechanism for fewer environmental resources.

**Keywords:** Socioeconomic status (SES), Infant exploration, Maternal encouragement, Responsiveness, Attention-following, Attention-directing

# SOSYOEKONOMİK SEVİYENİN VE ANNE DAVRANIŞLARININ BEBEKLERİN KEŞİF DAVRANIŞLARINDAKİ ROLÜ

## ÖZET

Bebeklerde keşif davranışı, bilişsel gelişimin temelini oluşturur ve bebeklerin problem çözme becerileri, alet kullanımı ve hedef odaklı davranışlarıyla ilişkilidir. Bazı çalışmalar, sosyoekonomik seviye (SES) ile bebeklerin keşfetme davranışı arasında anlamlı bir ilişki raporlamakta, ancak bu ilişki tüm çalışmalar tarafından desteklenmemektedir. Bu tez çalışmasının ilk amacı, SES ile bebeklerin keşif davranışı arasındaki ilişkide anne davranışlarının (yani, annenin keşfi teşvik edici, duyarlı ve dikkat yönlendirme/takip etme davranışları) düzenleyici rolünü araştırarak bu çelişkili bulguları açıklamaktır. Ayrıca, annenin dikkati yönlendirme/takip etme ve duyarlılığı gibi davranışları bebeklerin keşif davranışıyla ilişkili olarak araştırılmış olsa da, bebeklerin keşif davranışlarını teşvik edebilecek ebeveyn davranışlarını inceleyen araştırmalar sınırlıdır. Bu nedenle, bu çalışmanın ikinci amacı, bebekleri keşfetmeye teşvik edebilecek belirli anne davranışları için bir kodlama şeması oluşturmak ve bu davranışlar ile bebeklerin keşif davranışları arasındaki ilişkileri incelemektir. Çalışmaya laboratuvar ortamında 110 anne-bebek ikilisi ( $Ort(SS)_{bebek\ yaşı} = 11,9(1,4)$ , yaş aralığı = 9,7 - 15,9 ay) katılmıştır. Bebeklerin keşfetme davranışları, bebeklerin 6 dakika boyunca bireysel oyun oynadıkları videolardan kodlanmıştır. Anne davranışları ise 10 dakikalık anne-bebek serbest oyun videolarından kodlanmıştır. Sonuçlar, annenin dikkati takip etme oranının ve yönlendirme sıklığının SES ile bebek keşif davranışı arasındaki ilişkiyi anlamlı şekilde düzenlediğini; bu ilişkinin annenin dikkati takip etme (yönlendirme) davranışı daha fazla (daha az) görüldüğünde daha zayıf (daha güçlü) olduğunu göstermiştir. Annelerin keşif teşvik edici davranışlarıyla ilişkili olarak, daha uyarıcı sorular soran ve bebeklerine yeni nesneleri sıklıkla sunan annelerin bebeklerinin keşif davranışlarının daha fazla görüldüğü ve daha karmaşık olduğu bulunmuştur. Bu sonuçlar, daha düşük sosyoekonomik seviyeye sahip ailelerden gelen bebeklerin kısıtlı çevresel kaynakları telafi etmek için annelerin dikkat takip davranışlarına daha fazla ihtiyaç duyabileceğini göstermektedir.

**Anahtar Sözcükler:** Sosyoekonomik seviye (SES), Bebeklikte keşif davranışı, Annelerin teşvik edici davranışları, Duyarlılık, Dikkati takip etme, Dikkati yönlendirme

## TABLE OF CONTENTS

<b>ACKNOWLEDGEMENT</b> .....	<b>v</b>
<b>ABSTRACT</b> .....	<b>vi</b>
<b>ÖZET</b> .....	<b>vii</b>
<b>TABLE OF CONTENTS</b> .....	<b>viii</b>
<b>LIST OF FIGURES</b> .....	<b>x</b>
<b>LIST OF TABLES</b> .....	<b>xi</b>
<b>1. INTRODUCTION</b> .....	<b>1</b>
<b>1.1. The Development of Exploratory Behaviors in Infants</b> .....	<b>2</b>
<b>1.2. Individual Differences in Infant Exploration: Relations to Social and Environmental Factors</b> .....	<b>3</b>
<b>1.2.1. Socioeconomic status and infant exploration</b> .....	<b>4</b>
<b>1.2.2. Maternal behaviors and infant exploration</b> .....	<b>6</b>
<b>1.3. Present Study</b> .....	<b>9</b>
<b>2. METHOD</b> .....	<b>11</b>
<b>2.1. Participants</b> .....	<b>11</b>
<b>2.2. Materials and Procedure</b> .....	<b>12</b>
<b>2.3. Data Coding</b> .....	<b>13</b>
<b>2.3.1. Infants' exploratory behaviors</b> .....	<b>13</b>
<b>2.3.2. Developing a coding scheme: maternal encouragement of infant exploration</b> .....	<b>14</b>
<b>2.3.3. Maternal attention-following and attention-directing behaviors</b> .....	<b>16</b>
<b>2.3.4. Maternal responsiveness</b> .....	<b>16</b>
<b>2.4. Data Analysis</b> .....	<b>17</b>
<b>3. RESULTS</b> .....	<b>18</b>

3.1. SES and Infant Exploratory Behaviors.....	20
3.2. SES and Maternal Behaviors .....	20
3.3. Maternal Behaviors and Infant Exploratory Behavior .....	21
3.4. Moderation Analyses.....	25
3.4.1. Maternal encouragement as moderator .....	25
3.4.2. Maternal responsiveness as moderator.....	25
3.4.3. Maternal attention-following and directing as moderator .....	26
4. DISCUSSION.....	29
4.1. Maternal Behaviors as Moderators .....	29
4.2. Maternal Encouragement of Exploration and Infant Exploration.....	32
4.3. Maternal Responsiveness, Attention-Following/Directing, and Infant Exploration.....	34
4.4. Socioeconomic Status .....	35
4.5. Strengths, Limitations, and Future Directions .....	36
5. CONCLUSION .....	38
REFERENCES.....	39
APPENDIX A .....	46
APPENDIX B .....	48

## LIST OF FIGURES

Figure 1. The Moderating Effect of Maternal Attention-Following Percentage on the Relationship Between SES and Infant Complex Exploratory Behavior .....	27
Figure 2. The Moderating Effect of Maternal Attention-Directing on the Relationship Between SES and Infant Complex Exploratory Behavior .....	28

## LIST OF TABLES

Table 2.1. Distribution of SES in the Sample .....	12
Table 3.1. Descriptive Statistics of the Study Variables .....	18
Table 3.2. Correlations Between SES, Maternal, and Child Variables.....	23

## 1. INTRODUCTION

Children actively seek out information rather than absorbing it passively (Gopnik, 2012; Piaget, 1954; Schulz, 2012). Young children's active information-seeking and exploration facilitate knowledge acquisition, making exploration a significant part of human development. Infants' exploratory behavior is associated with cognitive abilities, such as early problem-solving skills and tool use (Bourgeois et al., 2005; Fontenelle et al., 2007; Tacke et al., 2015).

According to Piaget (1945), children's exploratory activity builds knowledge of the world through playful interactions with the environment. Infant exploration builds the groundwork for later cognitive development and sheds light on the emergence of higher-level cognitive processes in younger children (McCall, 1974). Indeed, referring back to Piaget, McCall (1974) mentions that the development of learning, intelligence, and the notion of causality emerge from infants' exploratory relationship with the environment. Infants' active exploratory behavior is supported by their natural curiosity, which supports successful learning. While some scholars equate curiosity with exploration, others view curiosity as the primary motivator for engaging in exploratory behavior (Berlyne, 1954; Jirout & Klahr, 2012). This primary motivator could be fueled by various things, such as thrill-seeking, play, neophilia, or ambiguity aversion (Bazhydai et al., 2020; Jirout & Klahr, 2012).

Previous studies suggest a link between infant exploratory behavior and families' socioeconomic status (SES) (Clearfield et al., 2014; Tacke et al., 2015), although this association has not been consistently reported across all studies (Collard, 1971; Holland et al., 2023). These contradictory findings may be due to potential moderating variables that have not been taken into consideration in previous studies. We suggest that certain maternal behaviors, such as responsiveness (Riksen-Walraven, 1978; Lawson et al., 1992; Van Den Boom, 1994), attention-following and directing behaviors (Bigelow et al., 2004; Landry & Chapieski, 1989; Pridham et al., 2000), and cognitive stimulation, which have been previously linked to infants' exploratory behavior (Belsky et al., 1980; Gottfried et

al., 2016; Jirout et al., 2018; Riksen-Walraven, 1978), might moderate the relationship between SES and infant exploration. The first goal of the study is to investigate whether these maternal behaviors play a moderating role between SES and infant exploration. Investigating these moderators is beneficial to explain contradictory findings in literature. Moreover, although previous studies established that certain maternal behaviors, such as responsiveness and attention-following, and directing, are related to infant exploration, there remains a gap in understanding which specific maternal behaviors actively encourage infants to explore. Therefore, the second goal of this study was to create a coding scheme aimed at identifying specific maternal behaviors that could potentially encourage infants to explore. Creating a coding scheme to examine maternal behaviors that may encourage exploration is beneficial to understanding differences in maternal behaviors influencing infant exploratory behavior.

### **1.1. The Development of Exploratory Behaviors in Infants**

Infant exploratory behavior involves multiple senses, including vision, touch, communication, and social interaction (Bazhydai et al., 2020; Bourgeois et al., 2005; Gibson, 1988). Infant exploration can take many forms, such as eye movements and physical investigation, including mouthing or hitting objects, approaching or avoiding objects, and requests for knowledge from others (Bazhydai et al., 2020). In young infants, exploratory activity develops from passive forms like visual scanning to more active ones like grasping, holding, and mouthing objects (Bazhydai et al., 2020).

The earliest example of infants' exploratory activity is visual exploration. Visual exploration is the capacity to scan an object's properties by gazing at it, which develops at about 2-3 months of age (Orr, 2021). Infants systematically scan their environment for information (Bazhydai et al., 2020). They prefer familiar items or, alternatively, selectively attend to unknown objects. Oakes and Tellinghuisen (1994) found that infants as young as seven months engaged in visual object examining, which involves focused looking during object manipulation as opposed to simply banging the objects or visually scanning over several objects as less attentive behaviors.

Around 4-5 months, when infants begin to learn to hold objects, oral exploration starts. This can happen with or without visual exploration (Orr, 2021). According to studies on object examination, haptic exploration enables young children to learn about objects' physical properties, sensory affordances, and potential for use as tools (Bazhydai et al., 2020). Clearfield et al. (2014) demonstrated that six-month-old infants were more likely to look at an object after actively mouthing it to validate what they had learned about its feel and form. At six months, infants who actively investigate and manipulate items pay more attention to changes in a visual display, indicating a connection between manual exploration and visual attention.

With the onset of locomotion and the development of motor skills, infants exhibit more active forms of exploration, such as grasping, holding, and mouthing objects, moving toward interesting objects, and asking their social partners for information through social looks, pointing, holdouts, and vocalizations (Bazhydai et al., 2020; Thurman & Corbetta, 2017). In the first year, manual exploration is referred to as "examining". Examining involves fingering (to comprehend texture and shape), rotating (to comprehend weight and distribution), and transferring (to comprehend size, shape, texture, and weight). Infant exploratory behavior is thought to become more complex with age (Belsky et al., 1980). Mouthing and fingering are considered more basic forms of exploration, while rotating and transferring are considered more complex (Clearfield et al., 2014). Throughout the course of the first year, an increase in more complex behaviors such as rotating and transferring, and reductions in less complex behaviors such as fingering and mouthing have been observed (Bazhydai et al., 2020; Clearfield, 2019; Clearfield et al., 2014).

## **1.2. Individual Differences in Infant Exploration: Relations to Social and Environmental Factors**

Infants do not share a common pattern in their exploratory behavior, reflecting individual differences (Clearfield et al., 2014; Rohr et al., 2022; Tacke et al., 2015). Individual differences in infant exploratory behavior may be influenced by various social and environmental factors, such as maternal behaviors and families' socioeconomic standing (Bernier et al., 2010; Collard, 1971; Holland et al., 2023). Below, we review the literature

on the associations between infant exploratory behavior, maternal behaviors relevant to infant exploration, and socioeconomic status.

### **1.2.1. Socioeconomic status and infant exploration**

Bronfenbrenner's (1994) bioecological model suggests that infant development is influenced by different ecological systems, ranging from proximal factors such as instant family interactions to distant factors such as culture. Within this model, parent-child interactions are thought to operate in the microsystem surrounding the child, which plays a crucial role in shaping infants' cognitive outcomes. Parent-child interactions are known to be closely related to families' socioeconomic status (SES) (Ashiabi & O'Neal, 2015; Bornstein & Bradley, 2014; Hoff et al., 2002). According to the family stress model, lower-SES parents experience higher stress due to financial problems, leading to higher parental stress, harsher and less responsive parenting, and poorer developmental outcomes in children (Conger & Elder, 1994). The family investment model, on the other hand, suggests an alternative route between SES and children's developmental outcomes (Conger & Donellan, 2007). According to this model, resources that support child development, such as learning materials and a cognitively stimulating home environment, are more readily available to families with higher SES.

Overall, extensive literature on SES demonstrates that SES is related to parenting practices and characteristics. However, what exactly it is about SES that associates with parenting and infant cognitive abilities remains largely unexplored. Some prior research indicates the reason why lower-SES parents value "strict obedience"; meanwhile, higher-SES parents value "independence," is the very nature of the occupations that different classes of parents have (Hoff et al., 2002). Kohn (1963) suggested that lower-SES parents tend to work in blue-collar jobs, and obedience is one of the requirements for this type of occupation. On the other hand, higher-SES parents tend to work in white-collar jobs, which require independent thinking and initiation. They proposed that this could explain why higher-SES parents tend to be more authoritative, while lower-SES parents tend to be more authoritarian. Moreover, lower-SES families commonly face uncertainties and stress related to poverty, which leads to a sense of powerlessness and low self-esteem,

and is associated with parenting (Bradley & Corwyn, 2002). Furthermore, living in a lower-SES environment lowers the energy capacity and contributes to feelings of anxiety and depression, which subsequently leads to lower-quality family relationships (Bradley & Corwyn, 2002).

Recent research revealed that infants from diverse socioeconomic backgrounds might exhibit different exploration patterns, highlighting the importance of SES. In Clearfield et al.'s (2014) study, infants were observed at six, nine, and twelve months of age in high- and low-SES groups (primarily measured by mother education and needs-assessment survey). High-SES infants demonstrated decreased basic exploratory behaviors, such as mouthing and fingering, while showing increased complex behaviors, such as rotating and transferring, over time. Moreover, while low-SES infants demonstrated a decrease in mouthing behaviors over time, this behavior was not replaced with another manual exploration. By 12 months, low-SES infants rotated and transferred the object significantly less than high-SES infants. Thus, throughout the study, low-SES infants showed fewer exploratory behaviors. The authors discussed that SES might affect infant exploration due to nutritional differences, variations in home affordances, and differences in maternal behaviors across SES levels.

Infants, aged 8 to 10 months, are able to match exploration strategies with the object material (Fontenelle et al., 2007). Matching appropriate exploratory strategies to particular objects is referred to as selective exploration, and it includes selecting appropriate strategies when exploring an object (e.g., squeezing the soft object or banging the rigid object). Tacke et al. (2015) investigated selective exploration in infants (6-8 and 10-12 months old) from different SES levels (assessed by maternal education and needs assessment survey). Infants from higher-SES households did not merely examine objects arbitrarily; they selected suitable methods to explore specific objects, while these strategies were not present in infants from lower-SES households. Another study investigated the exploratory behaviors of 6-month-old infants with environmental (lower SES) and biological risk (preterm infants) factors and compared them with infants without any risk (Rohr et al., 2022). SES was measured with the poverty income ratio (family income divided by poverty level in the area of the family house) and maternal education.

Environmental risk contributed to the difficulties in exploratory activity more than biological risk. The most disadvantaged group was the environmental risk (lower SES) group, as they performed worse than infants in the biological risk group.

Although these studies report a significant relationship between SES and infant exploration, some previous research has failed to find such significant associations. An earlier study compared infants' (8.5 - 13 months) exploratory and play behavior in institutions and found more variety in exploratory behaviors in middle-class compared to lower-class infants, but not in the number of exploratory behaviors (Collard, 1971). A recent study, Holland et al. (2023), longitudinally investigated the development of object exploration with infants (2-18 months) in a Latino sample. They found that infants in the Latino sample followed a trajectory of development similar to that of higher-SES infants in their object exploration, even though they reported lower SES. Researchers concluded that the findings of lower SES following a different trajectory of exploratory behavior may be due to some variable other than just SES, such as maternal behaviors.

In sum, there are conflicting findings regarding the relationship between SES and infant exploratory behavior. On the one hand, there are studies suggesting that SES is related to infant exploration (Clearfield et al., 2014; Rohr et al., 2022; Tacke et al., 2014). On the other hand, there are other studies that report lower and higher SES infants following a similar trajectory of exploratory behavior (Collard et al., 1971; Holland et al., 2023). These contradictory findings regarding the relationship between SES and infant exploratory behavior may be due to a lack of consideration of moderating variables in this relationship. It is plausible that certain maternal behaviors would moderate the relationship between SES and infants' object exploration behaviors.

### **1.2.2. Maternal behaviors and infant exploration**

Many studies suggest a close relationship between maternal behaviors and infant exploratory behaviors. Maternal behaviors such as responsiveness (Riksen-Walraven, 1974; Van Den Boom, 1994), maternal attention-following and directing (Landry & Chapieski, 1989; Pridham et al., 2000), and maternal stimulation and

curiosity/exploration promoting (Belsky et al., 1980; Lee et al., 2023) were found to be associated with infant exploratory behaviors. Below, we review the previous literature on the relationship between specific maternal behaviors (responsiveness, attention-following and directing, and encouragement/stimulation) and infant exploratory behavior.

#### **1.2.2.1. Maternal responsiveness**

Maternal responsiveness (or sensitivity) is one of the most substantial aspects of the infant-caregiver relationship. Responsiveness refers to the general “sensitivity” of the caregiver to the infant’s behaviors and how appropriate those response behaviors are (Bornstein & Tamis-LeMonda, 1989). According to Ainsworth et al. (1974), as cited in Mesman & Emmen (2016), sensitivity is defined as a parent's capacity to recognize a child’s cues, accurately interpret these cues, and react to these cues in a timely and appropriate manner. Bornstein and Tamis-LeMonda (1989) found that mothers’ responsive behaviors varied for different infant behaviors, such as picking up and vocalizing when the infant is distressed but imitating the infant and vocalizing when the infant is not distressed. Therefore, the responsive behavior of the parent may change for different parent-infant dynamics.

Maternal responsiveness might signal security, which would foster infants’ exploration, persistence, and learning (Bornstein & Tamis-LeMonda, 1989). Regarding the relationship between maternal responsiveness and infant exploration, studies showed that maternal responsiveness is associated with more complex exploratory behavior and novelty preference in infants. Riksen-Walraven (1978) demonstrated that in 9-month-old infants, maternal sensitivity intervention led to more concentrated exploration and improved infants' capacity to recognize causal mechanisms. A later study demonstrated that enhancing maternal responsiveness via an intervention at six months improved the quality of infant exploration at nine months. Compared to the infants in the control condition, infants in the intervention condition engaged in more complex cognitively based forms of exploration, such as relational exploration, defined as high rates of manipulating two or more objects simultaneously (Van Den Boom, 1994). Another study

also found that infants' focused exploration was positively related to the mother's responsiveness (Lawson et al., 1992).

Although the previous research on the relationship between maternal responsiveness and infant manual exploratory behavior is limited, the findings demonstrate that increased maternal responsiveness is associated with more competent exploratory strategies in infants (Riksen-Walraven, 1974; Van Den Boom, 1994).

#### **1.2.2.2. Maternal attention- following and directing behaviors**

Maternal attention-following and directing behaviors constitute one aspect of mother-infant interactions. In previous studies, maternal attention-following and directing behaviors were generally divided into two categories, namely, following and directing (Akhtar et al., 1991; Mason et al., 2019; Miller et al., 2009; Tomasello & Todd, 1983). *Following* refers to when caregivers follow their infants' attention, where they manipulate or talk about the objects their infant is attending to. *Directing* refers to when parents manipulate, talk about, or point to an object when the infant is attending to something else (Tomasello & Todd, 1983).

Importantly, there is evidence linking mothers' attention-following and directing behaviors to infant exploratory behavior. One study found that caregivers' attention-directing behavior was negatively associated with infants' detailed manual and visual exploration, as well as their appropriate play with toys (Landry & Chapieski, 1989). However, in another study, although infants' duration of toy manipulation was linked to their risk level (preterm with high or low medical risk conditions), maternal attention-directing was not associated with the number of toys infants noticed and examined (Landry & Chapieski, 1988). Nonetheless, Landry et al. (1996) found that mothers' attention-following and toy-introducing behaviors positively predicted play complexity (e.g., manipulating the toy) in six-month-olds. Similarly, maternal attention-directing behavior was negatively associated with eight-month-old infants' toy exploration (Pridham et al., 2000).

### **1.2.2.3. Maternal encouragement of exploration and stimulating maternal behaviors**

In addition to maternal responsiveness and attention-following and directing behaviors, stimulating maternal behaviors may play a role in fostering infants' cognitive skills, including exploration. For instance, a recent study reported that parents' self-reported curiosity-promoting behavior, such as child-directed play, cognitive stimulation, and diverse daily activities, is associated with infants' early form of curiosity, measured with the violation of expectation paradigm (Lee et al., 2023).

Previous research on infants' object exploration reported contradictory findings on the relationship between parents' stimulating behaviors and infant exploration. In a study with infants aged nine, 12, 15, and 18 months, maternal stimulation-encompassing behaviors, such as demonstrating, pointing, and instructing, were significantly related to infants' exploratory competency (Belsky et al., 1980). Furthermore, in their second study with 12-month-old infants, it was found that experimentally manipulating mothers' stimulating behaviors resulted in increased exploration competency for infants. However, in another study coding for various maternal behaviors, including looking at the infant, pointing to an object, calling the infant's name, and establishing physical contact, the overall frequency of these maternal behaviors labeled as the "stimulation score" was not significantly related to infant exploratory behavior (measured by object manipulation and cup-test) (Riksen-Walraven, 1978). Thus, previous research on the relationship between maternal stimulation and infant exploration is limited, and the results are contradictory. This inconsistency may be partially due to the fact that stimulating maternal behaviors were defined differently in these two studies. More importantly, there seems to be a lack of research on which specific maternal behaviors might encourage infants' object exploration.

### **1.3. Present Study**

Infant exploration is associated with later cognitive development, such as problem-solving skills and tool use (Fontenelle et al., 2007; Ruff, 1986; Tacke et al., 2015). Piaget suggests that exploration is the root of cognitive abilities such as object permanence,

causal understanding, and learning processes (McCall, 1974). Previous studies showed that infant exploration is associated with SES (Clearfield et al., 2014; Tacke et al., 2015). However, these associations were not consistently found in the literature, as some studies showed that lower-SES infants follow a similar trajectory in exploratory behavior to higher-SES infants (Collard, 1971; Holland et al., 2023). These inconsistent findings may be due to potential moderator variables in the relationship between SES and infant exploratory behavior that were not considered in the previous research. Maternal variables such as attention-following, responsiveness, and encouragement of exploration might define the strength of the relationship between SES and infant exploratory behavior. Hence, the first goal of this study was to investigate the relationship between SES and infant exploration by considering the role of maternal behaviors such as responsiveness, attention-following and directing, and encouragement of exploration in this relationship. We expected the relationship between SES and the frequency and complexity of infant exploratory behaviors to be moderated by maternal encouragement of exploration (Hypothesis 1), maternal responsiveness (Hypothesis 2), and maternal attention-following and directing (Hypothesis 3). Specifically, we expected that positive maternal behaviors might act as a buffer by reducing the negative effects of lower SES on infant exploratory behavior.

Infant exploration literature suggests that maternal responsiveness (Lawson et al., 1992; Riksen-Walraven, 1978; Van Den Boom, 1994) and maternal attention-following behaviors (Bigelow et al., 2004; Landry & Chapieski, 1989; Pridham et al., 2000) are associated with more competent exploration in infants. Regarding the impact of maternal stimulation on infant exploration (encompassing behaviors such as looking at the infant, pointing to an object, and demonstrating), studies are limited with contradictory results (Belsky et al., 1980; Riksen-Walraven, 1978), indicating a lack of research on maternal actions that potentially promote infant exploration. Hence, the second goal of the current study was to develop a coding scheme for maternal behaviors that may encourage and promote infant exploratory behavior and examine the associations between these behaviors and infant exploration.

The current study is based on a secondary data analysis where data from mother-infant dyads have been collected in a laboratory-based study. Infants were aged between 9 and 16 months. Maternal behaviors were measured and coded from ten-minute free-play sessions with the infant and parent. Infant exploratory behaviors were measured and coded from six-minute solo play sessions. Infant exploratory behaviors that were coded include both basic actions, such as mouthing and fingering, as well as more complex actions, like rotating and transferring (Clearfield et al., 2014). In order to measure exploration, we used both the *frequency* and *complexity* of exploratory behaviors. Exploration frequency was calculated as the total of all exploratory behaviors. The proportion of complex exploration was calculated by adding rotating and transferring and dividing it by all the exploratory behaviors (mouthing, fingering, rotating, and transferring).

Regarding maternal behaviors that encourage infant exploration, we created a coding scheme by focusing on five dimensions, namely, offering novel objects, information giving, asking stimulating questions, praising effort, and creating novel scenarios. These dimensions were selected based on their potential to encourage exploratory behavior in infants. More detailed information on these dimensions is provided in Section 2.3.2.

## 2. METHOD

### 2.1. Participants

The sample consisted of 110 parent-infant dyads. Infants' (42.7% female) age ranged between 9.7 months to 15.9 months ( $M = 11.9$ ,  $SD = 1.38$ ). SES was indexed following Berzofsky et al. (2014), and it included education, employment status, and income. For this index, education was coded as 0 if the mother was a primary or middle school graduate, 1 if she was a high school graduate, 2 if she was a college graduate, and 3 if she had a master's or doctoral degree. Employment status was coded as 1 if the mother was working full-time or part-time and 0 if not. Income level ranges were coded from 0 (lowest range) to 5 (highest range). The income ranges corresponding to these categories

have been periodically updated based on the minimum wage due to the rapid changes in the country's economy and incomes throughout the project<sup>1</sup>. The SES index was created by taking the sum of education level, employment status, and income level. The distribution of SES in the sample is presented in Table 2.1. The sample's composite SES score ranged from 1 to 9 ( $M = 6.04$ ,  $SD = 2.37$ ).

**Table 2.1.** Distribution of SES in the Sample

Levels	Frequency	% of Total
1	3	2.7%
2	10	9.1%
3	9	8.2%
4	8	7.3%
5	12	10.9%
6	8	7.3%
7	21	19.1%
8	24	21.8%
9	15	13.6%

## 2.2. Materials and Procedure

This study is part of a larger study in which parent-infant dyads were invited to the laboratory and asked to complete tasks, including screen-based tasks to assess infant attention, infant solo play with one toy, infant solo play with five toys, parent-infant free play, and other forms and scales for the caregiver.

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<sup>1</sup> The initial income categories were (The minimum wage was 5500 TL): 2200 TL and lower = 0, 2200 TL - 4015 TL = 1, 4015 TL - 5700 TL = 2, 5700 TL - 8090 TL = 3, 8090 TL - 14470 TL = 4, 14470 TL and higher = 5. These income categories were updated due to the changes in minimum wage. The updated income categories were (The minimum wage was 8506 TL): 6200 TL and lower = 0, 6200 TL - 8800 TL = 1, 8800 TL - 12500 TL = 2, 12500 TL - 22360 TL = 3, 22360 TL - 35000 TL = 4, 35000 TL and higher = 5.

Six-minute infant solo play videos were used to measure infants' exploratory behavior. In this task, infants were seated in front of a small table on their mothers' laps, and mothers were instructed not to interact with their infants. The researcher sat across the table from mother-infant dyads. Five different toys were given to infants; these were colored keys attached to a ring, a rattle dog, a rattle turtle, maracas with a soft top, and two rings connected together. Two cameras facing the table recorded the infant's play.

To measure maternal encouragement of exploration and maternal attention-following and directing behaviors, 10-minute infant-parent free-play videos were used. Mothers were instructed to play with their infants as they typically do at home during free play. Seven different toys were given to mother-infant dyads; these were colored cups that go in each other, a plush yellow chick, a shape sorting toy, a red car, a wire bead maze, a drum and sticks, and a sensory cloth book.

For each family, the laboratory visit took approximately 120 minutes. Parent-infant dyads received a participation certificate and a grocery gift voucher.

## **2.3. Data Coding**

### **2.3.1. Infants' exploratory behaviors**

Infant exploratory behavior was coded from infant solo play videos using ELAN (Lausberg & Sloetjes, 2009), the video coding software, and frequencies of different exploratory behaviors were measured. The coding scheme was adapted from Clearfield et al. (2014). The frequency of four different infant exploratory behaviors was coded. These behaviors included mouthing, fingering, rotating, and transferring. *Mouthing* was defined as the extent to which an object touches any part of the inside or outside of the infant's mouth, including the lips, tongue, teeth, and gums. *Fingering* was defined as the frequency with which the infant touches or scans the object's surface with the fingertips. *Rotating* was defined as the frequency with which the infant uses their wrist to move an object in space (Ruff, 1984; Ruff & Lawson, 1990). *Transferring* was defined as the

frequency of the infant moving the toy from one hand to another, where the new hand can support the toy's weight (Ruff, 1984; Ruff & Lawson, 1990).

Following previous studies, some exploratory behaviors were considered more complex (such as rotating and transferring) and others more basic (such as mouthing and fingering). In addition to the frequency of exploratory behaviors, the proportion of complex exploratory behaviors was computed and used in the analyses. This proportion was computed by dividing the number of complex exploratory behaviors (rotating and transferring) by the number of all exploratory behaviors (mouthing, fingering, rotating, and transferring).

Infant exploratory behavior was coded by two undergraduate psychology students and the author of this thesis. Interrater reliability was measured with Cohen's kappa. 10 videos were coded separately in order to establish reliability. Interrater reliability scores were as follows: .99 for mouthing, .88 for fingering, .93 for rotating, and .96 for transferring dimension. After setting the reliability, each assistant coded approximately 36 videos.

### **2.3.2. Developing a coding scheme: Maternal encouragement of infant exploration**

Maternal encouragement of exploration was coded from the ten-minute free-play videos, which were divided into two-minute intervals. Five maternal encouragement behaviors were coded; these were offering novel objects, information giving, asking stimulating questions, praise for effort, and creating novel scenarios. Every two-minute interval was coded for these maternal variables on a Likert scale of one to five, except for offering novel objects, which was coded by frequency. Scores on each dimension were converted into a Z score. A composite maternal encouragement score was computed by averaging Z scores of all five dimensions (offering novel objects, information giving, asking stimulating questions, praise for effort, and creating novel scenarios).

*Offering novel objects* is the extent to which the parent introduces new objects to the child. This dimension was included based on previous literature suggesting that novelty drives curiosity and infant exploratory behavior. Berlyne (1954) suggests that novel

stimuli provoke exploratory activity. Moreover, Piagetian theory proposes that when confronted with novel stimuli, infants explore the stimuli in order to either assimilate the new information into existing ones or accommodate new schemas (Bazhydai, 2020). *Information giving* is defined as the extent to which the parent demonstrates how to play with an object and gives information about it, e.g., “Look, this is how you play with this.” (*1 = Not at all instructive, 5 = Highly instructive*). This dimension was included based on Vygotsky’s theories, suggesting infants learn and explore more when they are guided by an adult who is more knowledgeable. Bonawitz (2011) also suggests that even though direct instruction limits exploration, scaffolding may help infants to explore. *Stimulating questions* is the extent to which the parent asks curiosity-provoking questions, e.g., “What do you think this does?” or “Look, this is spinning; what else is spinning here?” (*1 = Not at all stimulating, 5 = Highly stimulating*). This dimension was based on previous findings suggesting that parents’ cognitive stimulation is related to positive child outcomes. For example, a previous study found positive associations between cognitive stimulation and higher Mental Developmental Index scores (Tamis-LeMonda et al., 2004). Furthermore, parents’ open-ended questions directed to children encourage a wider range of answers without limiting children’s responses to categories and enhance divergent thinking (Brubacher et al., 2019). *Praise for effort* is the extent to which the parent praises the effort and persistence of their infant, e.g., “Good job! You made a very good effort!” (*1 = No praise, 5 = Many praise*). This dimension was based on the previous findings suggesting that parental praise predicts infant persistence and exploratory behavior. For example, Lucca et al. (2019) found that infants were encouraged to play and try more when their parents praised their efforts. *Creating novel scenarios* is the extent to which the parent sets up novel scenarios for play and uses objects out of their intended or “proper” use, e.g., a parent who uses Legos to represent a traffic light (*1 = Not at all creative, 5 = Highly creative*). This dimension was included based on the previous exploration literature suggesting that novelty is one of the primary motivators for exploration. Mothers who encourage their children to think in a different way about an object might be encouraging exploratory behavior. As Bonawitz (2011) suggested, children explore more when they are introduced to alternative ways when facing stimuli.

Maternal encouragement of exploration was coded by one undergraduate student and the author of this thesis. Interrater reliability was measured with Cohen's kappa. 10 videos were coded separately in order to establish reliability. Interrater reliability scores were as follows: for offering novel objects .89, for information giving .87, for stimulating questions dimension .86, for praise for effort .85, and for creating novel scenarios .94. After setting the reliability, each assistant coded 55 videos.

### **2.3.3. Maternal attention-following and attention-directing behaviors**

Maternal attention-following and directing behaviors were coded from 10-minute infant-parent free-play videos using ELAN (Lausberg & Sloetjes, 2009), the video coding software. The coding scheme was adapted from Landry and Chapieski (1989). Coders marked each following and directing behavior of the mothers. Mothers' talking about, touching, or showing the object that the infant is looking at and interested in was categorized as *following*. *Directing* was coded when the infant is interested in an object, and the mother attempts to draw the infant's attention to another object.

Maternal attention-following and directing behaviors were coded by two undergraduate students and the author of this thesis. Interrater reliability was measured with Cohen's kappa. 10 videos were coded separately in order to establish reliability. Interrater reliability scores were as follows: .93 for following and .84 for directing. After setting the reliability, each assistant coded approximately 36 videos.

### **2.3.4. Maternal responsiveness**

The coding was completed based on the Mother-Child Affect, Responsiveness and Engagement Scale by Tamis-LeMonda (1999). According to this coding scheme, *responsiveness* refers to mothers' appropriate responses to their child's signals, such as pointing, speech, and gaze. The extent to which the mother realizes the child's signals and reacts accordingly is coded (e.g., Putting the toy in front of the child when the child points to it). For the coding, free-play videos were divided into five two-minute intervals.

Each interval was coded on a 5-point Likert scale ranging from 1 = “not observed” to 5 = “constantly observed”.

Maternal responsiveness was coded by one undergraduate and one graduate student by using the 10-minute infant-mother free-play videos. Interrater reliability was measured with Cohen’s kappa. 11 videos were coded separately in order to establish reliability. Interrater reliability for maternal responsiveness was .94. After setting the reliability, each assistant coded 55 participants.

## **2.4. Data Analysis**

First, normality analyses were conducted. Since most of the variables were not distributed normally, Spearman correlation analyses were used to assess bivariate relationships between all variables. With the correlation analyses, the relationships between the variables (i.e., SES, infant exploration, and maternal behaviors) were assessed. To test whether maternal variables moderate the relationship between SES and infant exploratory behavior, moderation models were constructed in R (R Core Team, 2022) by using the Process Macro extension with a bootstrap procedure involving 10000 resamplings and a 95% confidence interval (CI) (Preacher & Hayes, 2008). Considering exploratory behavior gets more complex with age, we controlled for age by including it as a covariate in the moderation analysis. In all models, SES was entered as a predictor, and the frequency of infant exploratory behavior and the complexity of infant exploratory behavior were entered as outcome variables separately.

In terms of maternal attention-following and directing behaviors, we used both the frequency and proportion. While raw frequency measures may represent overall activity, proportion ratings provide information about the quality of maternal behaviors. In separate models, maternal encouragement composite score, responsiveness, and both the frequency and proportion of attention-following and directing behaviors were entered as moderators in the relationship between SES and infant exploratory behavior.

Outliers that exceeded three standard deviations away from the mean were excluded only from the relevant analyses. A total of five participants' data were excluded from the analysis for infant exploratory behaviors (two for mouthing, two for rotating, and two for transferring), three for maternal attention-following and directing (two for following and two for directing), one for maternal responsiveness, and six for maternal encouragement of exploration and its dimensions (five for encouragement composite score, four for information giving, seven for stimulating questions, five for creating novel scenarios, three for offering novel objects, six for praise for effort). There was one missing participant for maternal encouragement of exploration due to technical issues in the free-play part of the session.

### 3. RESULTS

In this section, we first report descriptive statistics (see Table 3.1). Next, we present correlations among maternal variables (i.e., attention-following and directing, encouragement and its dimensions, and responsiveness) and infant variables (i.e., mouthing, fingering, rotating, transferring, exploration frequency, and complex exploration percentage) (see Table 3.2). Finally, we report the results of the moderation analyses.

**Table 3.1.** Descriptive Statistics of the Study Variables

	<b>Mean</b>	<b>SD</b>	<b>Min</b>	<b>Max</b>
<i><b>Maternal Behaviors</b></i>				
Attention-Following Frequency	7.8	4.6	0	23
Attention-Following Percentage	27.9	15	0	69
Attention-Directing Frequency	15.1	7.5	2	39
Attention-Directing	51.6	17.8	15.6	91.7

Percentage				
Maternal Encouragement (Composite Score)	-0.001	0.56	-0.93	1.73
Offering Novel Objects	6.2	5.8	0	26
Information Giving [1-5]	2.3	0.7	1	4.4
Asking Stimulating Questions [1-5]	1.0	0.08	1	1.4
Praise for Effort [1-5]	1.5	0.6	1	4.4
Creating Novel Scenarios [1-5]	1.4	0.5	1	3.4
Responsiveness	14.5	5.2	5	25

***Infant Exploratory Behaviors***

Mouthing	3.9	5.7	0	32
Fingering	24	11.2	3	51
Rotating	16.5	11.1	2	51
Transferring	10.8	9.9	0	52
Exploration Frequency	55.3	25.5	5	129
Complex Exploration (%)	46	16	9	85

The following analyses initially explore the associations between SES and infant exploratory behavior, SES and maternal behaviors, maternal behaviors and infant exploratory behaviors, respectively. Next, moderation analyses were conducted to

investigate whether the relationship between SES and infant exploratory behavior was moderated by maternal behaviors such as maternal encouragement of exploration (Hypothesis 1), responsiveness (Hypothesis 2), and attention-following/directing (Hypothesis 3).

### **3.1. SES and Infant Exploratory Behaviors**

As shown in Table 3.2, SES was significantly negatively correlated with fingering behavior ( $r_s = -.23, p = .016$ ), but was not associated with other exploratory behaviors, total exploration frequency, and complex exploration percentage. Correlation analyses further showed that infant age was negatively correlated with mouthing ( $r_s = -.38, p < .001$ ), rotating ( $r_s = -.28, p = .004$ ), transferring ( $r_s = -.26, p = .007$ ), and total exploration frequency ( $r_s = -.32, p < .001$ ). When infant age was controlled, SES was still significantly correlated with fingering behavior ( $r_s = -.23, p = .016$ ).

### **3.2. SES and Maternal Behaviors**

Regarding maternal behaviors, mothers from higher-SES backgrounds were more likely to be responsive ( $r_s = .34, p < .001$ ), follow their infants' attention more (frequency:  $r_s = .28, p = .003$  and proportion:  $r_s = .32, p < .001$ ), and direct their infants' attention less (frequency:  $r_s = -.37, p < .001$  and proportion:  $r_s = -.46, p < .001$ ). Higher-SES mothers were also more likely to offer novel objects ( $r_s = .23, p = .016$ ), engaged in information giving more frequently ( $r_s = .38, p < .001$ ), and had a higher composite score for encouragement of infant exploration ( $r_s = .34, p < .001$ ).

Mothers of older infants offered fewer new objects ( $r_s = -.35, p < .001$ ), were more responsive ( $r_s = .22, p = .03$ ), proportionately followed their infants' attention more ( $r_s = .20, p = .04$ ), and also directed their infants' attention more ( $r_s = .26, p < .01$ ). When controlling for infant age, significant associations between SES and maternal behaviors remained significant: SES was still significantly positively correlated with total encouragement score ( $r_s = .34, p < .001$ ), offering novel objects ( $r_s = .26, p = .007$ ), and

information giving ( $r_s = .38, p < .001$ ). SES was not significantly correlated with other dimensions coded as maternal encouragement, namely, asking stimulating questions, praise for effort, and creating novel scenarios. When controlling for age, mothers from higher-SES backgrounds were more likely to be responsive ( $r_s = .34, p < .001$ ), follow their infants' attention more (frequency:  $r_s = .28, p = .003$  and proportion:  $r_s = .32, p < .001$ ), direct their infants' attention less (frequency:  $r_s = -.38, p < .001$  and proportion:  $r_s = -.49, p < .001$ ).

### 3.3. Maternal Behaviors and Infant Exploratory Behavior

Among maternal encouragement of exploration variables, offering novel objects was significantly positively correlated with mouthing ( $r_s = .24, p = .013$ ), fingering ( $r_s = .31, p = .001$ ), and total exploration frequency ( $r_s = .29, p = .002$ ). Information giving, praise for effort, and creating novel scenarios scores did not significantly correlate with any of the infant exploratory behaviors. On the other hand, asking stimulating questions was significantly positively correlated with rotating ( $r_s = .22, p = .03$ ) and total exploration frequency ( $r_s = .21, p = .04$ ). Finally, the encouragement composite score significantly correlated with mouthing ( $r_s = .20, p = .04$ ).

Maternal attention-following frequency and percentage, and maternal attention-directing frequency were not significantly correlated with any infant exploratory behaviors. However, maternal attention-directing percentage was significantly negatively correlated with rotating ( $r_s = -.24, p = .01$ ), transferring ( $r_s = -.20, p = .04$ ), and exploration frequency ( $r_s = -.22, p = .02$ ). Maternal responsiveness did not significantly correlate with any of the infant exploratory behaviors.

Since infant age correlated with most of the variables (namely, mouthing, fingering, transferring, exploration frequency, offering novel objects, responsiveness, following, and directing proportion; see Table 3.2), correlation analyses were conducted by controlling for age. When controlling for age, infants whose mothers followed their attention more rotated ( $r_s = .22, p = .03$ ) and transferred ( $r_s = .22, p = .03$ ) objects more, also their object exploration was more complex ( $r_s = .21, p = .03$ ). Infants of mothers who

asked more stimulating questions also rotated objects more ( $r_s = .22, p = .03$ ) and a higher overall exploration frequency ( $r_s = .21, p = .04$ ). Moreover, mothers who offered more novel objects had infants that fingered the objects more ( $r_s = .28, p = .004$ ), explored in a less complex manner ( $r_s = -.21, p = .03$ ), and had a higher overall exploration frequency ( $r_s = .21, p = .03$ ). Lastly, infants whose mothers followed their attention more proportionately explored more in a more complex way ( $r_s = .21, p = .03$ ).

**Table 3.2.** Correlations Between SES, Maternal, and Child Variables

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1. Infant Age																		
2. SES	.02																	
3. Encouragement Composite Score	-.11	.34***																
4. Information Giving	.03	.38***	.65***															
5. Stimulating Questions	-.03	.02	.65***	.17														
6. Praise for Effort	.17	.19	.53***	.36***	.14													
7. Creating Novel Scenarios	.07	-.04	.50***	.12	.11	.07												
8. Offering Novel Objects	-.35***	.23*	.48***	.03	.08	-.02	.15											
9. Attention-Following Frequency	.14	.28**	.20*	.33***	.09	.22*	-.03	-.15										
10. Attention-Following Proportion	.20*	.32***	.05	.28**	.09	.19	-.15	-.37***	.78***									
11. Attention-Directing Frequency	.17	-.37***	-.08	-.08	-.17	.03	.12	-.14	-.06	-.49***								
12. Attention-Directing Proportion	.26**	-.46***	-.45***	-.30**	-.22*	-.07	.01	-.51***	-.39***	-.50***	.76***							

13.Responsiveness	.22*	.34***	.45***	.51***	.11	.46***	.19	-.08	.33***	.38***	-.08	-.21*						
14.Mouthing	-.38***	.01	.20*	-.03	.02	.09	.11	.24*	.05	-.09	-.01	-.15	-.16					
15.Fingering	-.11	-.23*	.10	-.09	.16	-.04	.01	.31**	-.08	-.14	-.05	-.11	-.11	-.02				
16.Rotating	-.28**	-.01	.06	.07	.22*	-.15	-.04	.14	.17	.07	-.13	-.24*	-.12	.29**	.38***			
17.Transferring	-.26**	.01	.09	.03	.18	-.06	.10	.01	.17	.12	-.15	-.20*	.03	.15	.23*	.63***		
18.Complex Exploration %	-.14	.16	-.04	.13	.16	-.16	-.04	-.16	.19	.18	-.14	-.12	.06	.06	-.25**	.63***	.71***	
19.Exploration Frequency	-.32***	-.04	.17	.02	.21*	-.09	.09	.29**	.07	-.06	-.06	-.22*	-.14	.32***	.64***	.85***	.70***	.39***

Note. \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$

### **3.4. Moderation Analyses**

A series of moderation analyses were conducted to assess the moderating effect of maternal variables (maternal encouragement, maternal attention-following and directing, and maternal responsiveness) on the relationship between SES and infant exploratory behavior. Specifically, the moderation analyses tested whether the relationship between SES and infant exploratory behavior (both in terms of frequency and complexity) was moderated by maternal encouragement (Hypothesis 1), maternal responsiveness (Hypothesis 2), and maternal attention-following and directing (Hypothesis 3). Across all models, infant age was controlled for its potential confounding effects. For an overview of moderation analyses, see Appendix A.

#### **3.4.1. Maternal encouragement as moderator**

The moderation model examining the moderating effect of maternal encouragement on the relationship between SES and infants' complex exploratory behavior was not statistically significant,  $F(4, 100) = 1.31, R^2 = .05, p = .27$ . When infants' exploration frequency (instead of exploration complexity) was used as the outcome variable, the moderation model with maternal encouragement was significant,  $F(4, 100) = 3.55, R^2 = .12, p = .0095$ . However, maternal encouragement did not emerge as a significant moderator ( $B = -1.23, t(100) = -0.62, CI [-5.19, 2.73], p = .54$ ). For the moderation analyses including specific dimensions of maternal encouragement of exploration, see Appendix B.

#### **3.4.2. Maternal responsiveness as moderator**

When infants' complex exploratory behavior was used as the outcome variable, the moderation model was not significant,  $F(4, 104) = 1.19, R^2 = .04, p = .32$ .

The moderation model with infants' exploration frequency as the outcome variable was significant,  $F(4, 104) = 3.22, R^2 = .11, p = .02$ . However, maternal responsiveness was

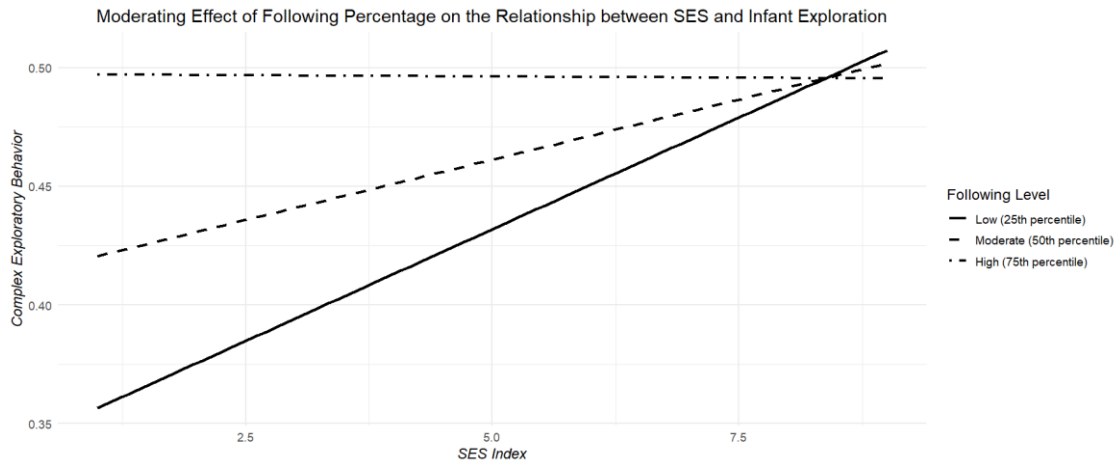
not found to moderate the relationship between SES and infants' exploratory behavior frequency,  $B = -0.24$ ,  $t(104) = -1.17$ , CI [-0.65, 0.17],  $p = .24$ .

### **3.4.3. Maternal attention-following and directing as moderator**

We used the proportion of maternal attention-following behaviors among all maternal attentional behaviors (following and directing) to describe the caregiver's interaction style as well as the frequency of those behaviors. Importantly, we found that proportion scores, but not raw frequencies, significantly moderated the link between SES and infant exploratory behavior. Below, we report the results of moderation analysis for both the maternal attention-following frequency and proportion.

#### **3.4.3.1. Maternal attention-following percentage as moderator**

The results of moderation analysis examining the moderating effect of maternal attention following percentage in the relationship between SES and complex exploratory behavior was statistically significant,  $F(4,104) = 3.15$ ,  $R^2 = .11$ ,  $p = .02$ . While controlling for infant age, maternal attention following percentage was found to moderate the relationship between SES and complex exploratory behavior (see Figure 1),  $B = -0.0010$ ,  $t(104) = -2.29$ , CI [-0.002, -0.0001],  $p = .024$ . SES was significantly associated with complex exploration when maternal following percentage was low ( $B = 0.023$ , CI [0.0058, 0.0403],  $p = .009$ ), but not when it was moderate ( $B = 0.0099$ , CI [-0.0028, 0.0226],  $p = .12$ ) or high ( $B = -0.0069$ , CI [-0.0259, 0.0121],  $p = .47$ ).



**Figure 1.** The Moderating Effect of Maternal Attention-Following Percentage on the Relationship Between SES and Infant Complex Exploratory Behavior

When exploration frequency (instead of complex exploration) was entered as the outcome variable, the results of the moderation analysis examining the moderating effect of maternal attention following percentage on the relationship between SES and exploratory behavior frequency was statistically significant,  $F(4,104) = 3.72$ ,  $R^2 = .13$ ,  $p = .007$ . While controlling for infant age, maternal attention following percentage was found to moderate the relationship between SES and exploratory behavior frequency,  $B = -0.1444$ ,  $t(104) = -2.05$ ,  $CI [-0.2844, -0.0045]$ ,  $p = .04$ . Although the interaction between SES and maternal attention following percentage was significant, the simple slopes at low ( $B = 2.51$ ,  $CI [-0.31, 5.32]$ ,  $p = .08$ ), moderate ( $B = 0.59$ ,  $CI [-1.47, 2.66]$ ,  $p = .57$ ), and high ( $B = -1.85$ ,  $CI [-4.94, 1.25]$ ,  $p = .24$ ) were not statistically significant.

### 3.4.3.2. Maternal attention-following frequency as moderator

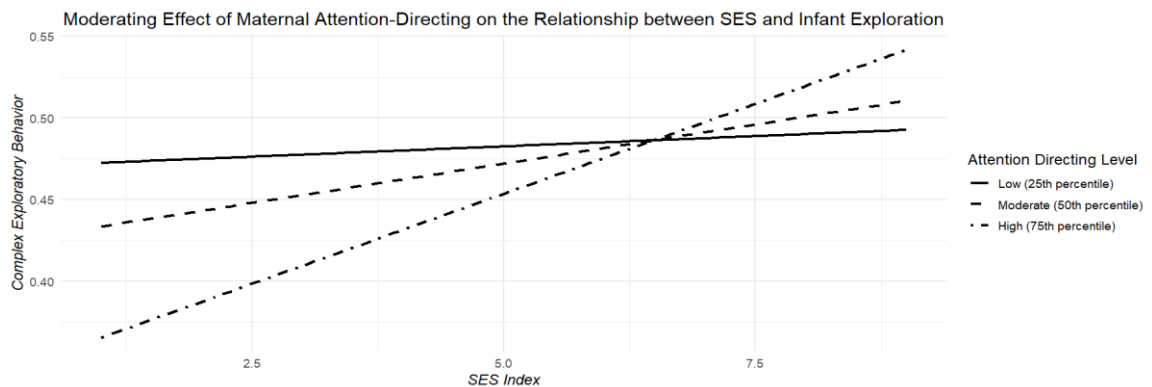
The moderation model examining the moderating effect of maternal attention-following frequency on the relationship between SES and infants' complex exploratory behavior was not statistically significant,  $F(4,103) = 2.11$ ,  $R^2 = .08$ ,  $p = .09$ .

The moderation model examining the moderating effect of maternal attention-following frequency on the relationship between SES and exploratory behavior frequency was

significant,  $F(4,103) = 3.09$ ,  $R^2 = .11$ ,  $p = .02$ . However, maternal attention-following frequency was not found to moderate the relationship between SES and exploratory behavior frequency,  $B = -0.09$ ,  $t(103) = -0.35$ ,  $CI [-0.59, 0.42]$ ,  $p = .73$ .

### 3.4.3.3. Maternal attention-directing frequency as moderator

The moderation model examining the moderating effect of attention-directing frequency between SES and infants' exploration frequency was statistically significant,  $F(4, 103) = 2.99$ ,  $R^2 = .10$ ,  $p = .02$ . However, maternal attention-directing frequency was not a significant moderator ( $B = 0.19$ ,  $t(103) = 1.27$ ,  $CI [-0.11, 0.49]$ ,  $p = .21$ ). However, the moderating effect of attention-directing frequency was significant when complex exploration frequency was entered as an outcome variable,  $F(4, 103) = 2.51$ ,  $R^2 = .09$ ,  $p = .04$ . Maternal attention-directing frequency was a significant moderator ( $B = 0.002$ ,  $t(103) = 1.97$ ,  $CI [-0.00, 0.0036]$ ,  $p = .0515$ ), see Figure 2. SES was significantly associated with complexity of infant exploratory behavior when attention-directing was high ( $B = .03$ ,  $CI [0.007, 0.045]$ ,  $p = .007$ ) but not at moderate ( $B = .009$ ,  $CI [-0.0053, 0.0223]$ ,  $p = .23$ ), or low ( $B = -.0005$ ,  $CI [-0.019, 0.018]$ ,  $p = .96$ ).



**Figure 2.** The Moderating Effect of Maternal Attention-Directing on the Relationship Between SES and Infant Complex Exploratory Behavior

#### **3.4.3.4. Maternal attention-directing percentage as moderator**

The moderation model examining the moderating effect of attention-directing percentage between SES and exploration frequency was statistically significant,  $F(4, 104) = 4.67$ ,  $R^2 = .15$ ,  $p = .002$ . However, maternal attention-directing percentage was not a significant moderator ( $B = 0.07$ ,  $t(104) = 1.07$ , CI [-0.06, 0.21],  $p = .29$ ). Finally, the moderation model examining the moderating effect of attention-directing percentage between SES and infant complex exploration was not statistically significant,  $F(4, 104) = 1.54$ ,  $R^2 = .06$ ,  $p = .20$ .

## **4. DISCUSSION**

The present study aimed to examine the moderating role of maternal behaviors, namely maternal encouragement, attention-following and directing, and responsiveness, in the relationship between SES and infant exploratory behavior. Furthermore, we aimed to create a novel coding scheme for maternal behaviors that might facilitate infant exploration and examine the relations between these encouragement behaviors and infant exploration.

### **4.1. Maternal Behaviors as Moderators**

This study was the first to investigate the moderating effect of maternal behaviors on the relationship between SES and infant exploratory behavior. We expected maternal encouragement, responsiveness, attention-following, and directing to act as moderators between SES and infant exploration, such that higher levels of these maternal variables (lower for attention-directing) compensate for the potential adverse effects of lower SES (such as poverty, nutritional deficits, limited number of toys) on infant exploration. Our findings partially supported this hypothesis. The proportion of mothers' attention-following behavior was a significant moderator, such that SES was positively significantly associated with the complexity of infant exploration only when the proportion of maternal attention-following was low, but not when it was moderate or high. A higher proportion of maternal attention-following may be compensating for the

possible adverse effects of lower SES. This finding parallels Bradley and Corwyn's (2002) review, where they argued that high-quality parenting plays a crucial role in the relationship between SES and child outcomes. More specifically, studies suggest that maternal attention-following is positively associated with infant exploration (Landry et al., 1996).

The analyses also revealed that attention-directing frequency significantly moderated the relationship between SES and infant complex exploration. SES was significantly positively associated with the complexity of infant exploratory behavior when attention-directing was high, but not at moderate or low levels. Infants from higher-SES families explored in a more complex manner only when their mothers directed their attention more. Family SES did not associate with infant exploration when maternal attention-directing was low. This result parallels the study of Pridham et al. (2000), which found that maternal attention-directing is negatively associated with infant exploratory behavior.

However, a moderating effect was not found for maternal encouragement and responsiveness. The lack of such an effect may be related to differences from previous studies in terms of the measurement of maternal and infant behaviors and infant age. For instance, in an earlier study that found a link between maternal responsiveness and infant exploration, responsiveness was coded as the proportion of infant behaviors the caregiver responded to (Riksen-Walraven, 1978). In the current study's coding scheme, the extent to which the mother realizes the child's signals and reacts accordingly was coded on a 5-point Likert scale from free-play videos divided into five two-minute intervals. Moreover, in Van den Boom's (1994) study, the responsiveness intervention led to more sophisticated exploration. However, the infants in this study were preselected for their negative emotionality. Moreover, responsiveness was measured during home observations by coding mothers' contingent responses to infant vocalizations or cries every 6 seconds. Lastly, a study that found a relationship between responsiveness and infant exploration defined exploration as serious concentration and manipulation of objects. This operationalization aligns more closely with focused attention compared to object exploration (Landry et al., 1992). Muentener et al. (2018) found that attention

(attention to novelty) and object exploration (efficiency of exploration and how many functions an infant found in a toy) tap into distinct categories. Hence, the differences in measurement and operationalizations could explain the lack of significant moderating effect of responsiveness on the relationship between SES and infant exploratory behavior.

Lastly, moderation analyses did not reveal a significant effect of maternal encouragement on the relationship between SES and infant exploration. This may be related to infants' age and readiness to comprehend the maternal encouragement of exploration. For example, praise for effort (a dimension of our coding scheme) was included in the coding scheme according to the previously found associations between mothers' persistence-focused language and exploratory behavior. However, Lucca et al. (2019) suggested that infants' understanding and production of persistence-focused language emerges at 18 months. It is plausible that mothers in our study also did not start using such strategies because their infants were not developmentally ready. In terms of the encouragement composite score, we did not find a significant moderating effect or a significant relationship. Riksen-Walraven (1978) measured maternal stimulation, which was similar to maternal encouragement of exploration in the current study, included looking at the infant, pointing to an object, calling the infant's name, and establishing physical contact (overall frequency of these behaviors were measured), was not significantly related to infant exploratory behavior (measured by object manipulation and cup-test). Infants in this study were also 9 to 12 months old. It is possible that if the study included older infants, the effect of maternal stimulation would have emerged as well. Moreover, maternal stimulation is likely to differ depending on the developmental capability of the infant (Belsky et al., 1980). Although we did not see a correlation between infant age and maternal encouragement of exploration, its dimensions may be more salient in the later months as the language and comprehension skills of the infant develop further. Especially, creating novel scenarios and stimulating questions may be related to infants' later developed cognitive abilities, such as pretend play and language (Fein, 1981; Kızıldere et al., 2020).

## **4.2. Maternal Encouragement of Exploration and Infant Exploration**

The study's second aim was to create a novel coding scheme that measures maternal encouragement of exploration. Maternal encouragement behaviors included five dimensions: offering novel objects, information giving, asking stimulating questions, praise for effort, and creating novel scenarios. Although the dimensions were not strongly correlated, we calculated a composite score by averaging the dimensions. This composite score was calculated in order to measure the general encouraging behaviors of the mothers that potentially facilitated or initiated infant exploration. Each dimension was included for its conceptual relation with infant exploration, and averaging those dimensions allowed us to investigate the overall construct. We found that the encouragement composite score (calculated by the average of the dimensions) was positively associated with infants' mouthing behavior; however, this composite score was not significantly associated with other dimensions of infant exploration. Aspects of infant exploration tended to be significantly associated with subdimensions of maternal encouragement behaviors. Infants rotated the objects more and had a higher total exploration frequency if their mothers were asking more stimulating questions. These findings align with previous research on maternal cognitive stimulation and open-ended questions. Parents' open-ended questions encourage a broader range of responses without limiting children's responses to categories, which promotes divergent thinking (Brubacher et al., 2019). Similarly, the current study demonstrated that stimulating questions from mothers potentially encourage exploration. This finding parallels the previous studies suggesting a link between maternal stimulation and infant exploratory behavior (Belsky et al., 1980). Moreover, maternal stimulation contributes to infant cognitive development (Albers et al., 2010). Children's cognitive performance improves when parents employ more statements that push them to think representationally (Albers et al., 2010). Previous studies also suggest associations between cognitive stimulation and higher mental development scores (Tamis-LeMonda et al., 2004).

The analyses also revealed that infants whose mothers offered more novel objects during free play demonstrated more exploratory behaviors. In addition, mothers who offered novel objects had infants who engaged more in fingering behaviors and mouthing.

Novelty has been seen as one of the motivations of exploratory behavior. Infants tend to explore novel objects compared to familiar ones (Bazhydai et al, 2020). An earlier study also found that 12-month-old infants explored the novel room containing novel toys more compared to the familiar room with familiar toys (Ross, 1974).

Information giving of mothers was not associated with any infant behaviors. This lack of significant finding might suggest that information giving may influence infants' attention to objects and play behaviors during play with their mothers but may not have long-term effects influencing infant exploration during individual play.

Another dimension that was not associated with infant exploration was mothers' praise for effort. As mentioned in section 4.1, the infants' ability to comprehend and respond to effort praising first peaks at 18 months old (Lucca et al., 2019). This could explain our nonsignificant finding.

Lastly, creating novel scenarios did not significantly correlate with any infant behaviors. It is possible that the age range of the current sample was too young to benefit from these behaviors, as creating novel scenarios may reflect the ability to understand pretend play, which is a later-developed ability that emerges after 12 months of age and peaks in early childhood (Fein, 1981).

It should be noted that asking stimulating questions, praise for effort, and creating novel scenarios dimensions had a lower variability, and creating novel scenarios was not a common activity. Global ratings of maternal behavior by using a Likert scale might be the reason for the observed low variability in these dimensions. It may be suggested that the sensitivity of the coding scheme could be improved with a microanalytic rating system (e.g., frequency ratings) as this type of rating can be more precise and objective (Morawska et al., 2015).

Finally, the composite score of maternal encouragement and maternal responsiveness was strongly correlated. This finding could suggest that these two share common variance. Although some dimensions of maternal encouragement (i.e., information giving and

offering novel objects) were highly correlated with maternal responsiveness, other dimensions (i.e., stimulating questions, creating novel scenarios, and offering novel objects) did not significantly correlate with maternal responsiveness, suggesting that only some of the maternal encouragement dimensions may overlap with responsiveness.

### **4.3. Maternal Responsiveness, Attention-Following/Directing, and Infant Exploration**

Regarding the relations between infant exploration and other maternal behaviors, we found that maternal attention-following was positively associated with the complexity of infant exploration. Maternal attention-following possibly facilitates more complex exploratory behaviors compared to when mothers direct their infants' attention. Following the infants' attention potentially indicates child-centered play, which may facilitate complex exploratory behavior by scaffolding the infant during play (Bigelow et al., 2004). Mothers may be able to help their children control and extend their infants' attention and exploration by following the infants' gaze, helping them regulate their focus (Pridham et al., 2000). Maternal attention-directing was associated negatively with the rotating, transferring, and exploration frequency of the infants. However, this association did not remain significant when we controlled for age.

Maternal responsiveness was not significantly associated with infant exploration. As mentioned in Section 4.1., previous studies found an association between maternal responsiveness and infant exploration (Landry et al., 1992; Riksen-Walraven, 1978; Van den Boom, 1984). However, these studies either preselected infants for temperament (Van den Boom, 1984), defined responsiveness differently (Riksen-Walraven, 1978), or operationalized exploration as focused attention (Landry et al., 1992).

Potentially, maternal behaviors could be more effective in joint play. This could be the reason why the current study found significant relationships between maternal responsiveness, maternal attention-directing, and maternal encouragement of exploration and infant exploratory behavior. In a study examining maternal behaviors and 12-month-old infants' play with objects, they found that infants played more appropriately and

functionally when playing with their mothers compared to when they played without maternal interaction (Bigelow et al., 2004). They suggested that joint activities with mothers may specifically promote infants' advanced play. Being in joint interactions with mothers may affect infants' exploratory behavior more than general responsiveness or encouragement of exploratory play. In a more recent study, Schatz et al. (2022) also found that infants' object manipulation is longer and more complex when they are in joint interaction with mothers. Moreover, mothers' action-oriented talk (such as "Where does this Lego go?") had a stronger association with play duration and complexity than just talking about anything. Similarly, in the current study, if we coded maternal encouragement of exploration and infant exploration from the same free-play video, we could potentially find a relationship. Mothers' encouraging behaviors could be more salient in the moment-to-moment play with their infants. It has been argued that joint interactions itself is a measure of maternal responsiveness and have been associated with maternal scaffolding (Hustedt & Raver, 2002). Hence, joint interactions with mothers' attention-following with their infants may be more salient to infant exploratory behavior compared to maternal encouragement or responsiveness. Maternal attention-following could also help infants extend and focus their attention on the objects more, which may facilitate exploration (Pridham et al., 2000).

#### **4.4. Socioeconomic Status**

We found significant relations between SES and maternal behaviors. Namely, SES was positively correlated with maternal attention-following and negatively correlated with maternal attention-directing. SES was also positively associated with maternal responsiveness and maternal encouragement of exploration. Higher-SES mothers encouraged their infants to explore, offered more novel objects, and gave more information about them. These findings parallel previous studies suggesting that parenting practices differ across different SES backgrounds. Lower-SES parents tend to be more punitive and controlling (Hoff & Laursen, 2019), provide more chaotic and unstructured environments (Roubinov & Boyce, 2017), and show less stimulation and responsiveness (Bornstein et al., 2003; Bradley & Corwyn, 2002). In contrast, higher-SES mothers are more likely to engage in extended conversations and use a broader

vocabulary with their children (Hoff, 2014; Hoff-Ginsberg, 1991). Similar to these findings, higher-SES mothers in the present study demonstrated positive maternal behaviors such as responsiveness, attention-following, and encouragement of exploration to a greater extent.

Regarding the relationship between SES and infant exploration, we found that SES was not significantly correlated with infant exploratory behaviors except for fingering, and this relationship was negative. Previous research on SES and exploratory behavior had conflicting results. While studies of Clearfield et al. (2014) and Tacke et al. (2015) found significant associations between SES and exploratory behavior in infants, Holland et al. (2023) and Collard (1971) did not find such significant associations. Based on previous findings and our results, it seems plausible to suggest that SES is not a consistent or direct predictor of infant exploratory behavior. Lastly, SES not being correlated with any infant exploratory behaviors could be potentially pointing to the theory that children and infants are more exploratory compared to adults, and this innate tendency helps them to explore and learn from their surroundings in a protected period, that is, childhood (Gopnik, 2020). Childhood is the time when their caregivers protect them, and there are not a lot of risks and costs to exploration. Exploring more in childhood and infancy allows humans to grow into more knowledgeable adults, where they can exploit the knowledge they accumulated during childhood (Gopnik, 2020). This theory argues that this predisposition to explore is global and innate, regardless of the context.

#### **4.5. Strengths, Limitations, and Future Directions**

This study was the first to examine the moderating effect of maternal behaviors on the relationship between SES and infant exploratory behaviors. A strength of the current study was that it had a larger sample size compared to previous studies examining these associations (Belsky et al., 1980; Pridham et al., 2001; Clearfield et al., 2014; Tacke et al., 2015), allowing robust results. Creating a novel coding scheme to specifically capture maternal behaviors that encourage infant exploratory behavior was also a first. Although our findings reflect that this coding scheme might need improvements, such as adjusting the behavioral categories that may be more salient at infancy or using longitudinal designs

to capture developmental changes in maternal behaviors, it is a step towards developing observational tools to explore how certain maternal behaviors impact early exploration.

The present study did not measure infants' motor skills. Motor abilities of the infants are connected with object manipulation and enable exploration and learning (Adolph & Hoch, 2019; Gibson, 1988). Involving a motor skills measure would allow future studies to determine whether the differences in exploratory behaviors are connected with maternal and SES factors or physical ability. Future studies should consider the motor development of the infants while studying object exploration. The current study also did not take infants' sustained attention abilities into consideration. Infants' ability to sustain attention has been found to be associated with exploratory behaviors. The examining behaviors of infants were found to be related to later sustained attention abilities (Ruff, 1986). Decreased exploratory behaviors could reflect an inability to sustain attention (Clearfield et al., 2014). Future studies should also take sustained attention into account.

We found that older infants engaged in exploratory behaviors to a lesser extent. Specifically, we found that mouthing, rotating, and transferring decrease with age. We expected mouthing to drop with age, as it is a basic form of exploration (Clearfield et al., 2014). However, we expected rotating and transferring to increase with age. One reason could be that these behavioral categories are basic for our sample's age, especially for infants older than 12 months. In this case, infants could have manipulated the objects in a different manner than our categories missed. It is possible that the infants incorporated more selective forms of exploration while manipulating the objects, such as banging the rigid objects and squeezing the soft ones. It could also be argued that presenting multiple toys could decrease infants' ability to focus on one toy and use different strategies with it. We had five different toys that the infants could manipulate. In contrast, Clearfield et al. (2014) solely used a rattle for infants to engage for two minutes. It is possible that manipulating a rattle affords more rotating and transferring compared to the toys in our study. The significant negative association between infant age and rotating, transferring, and overall exploration frequency could be explained by the novelty of the toys. It could be possible that the toys provided to the infants are familiar, and infants do not find them interesting to manipulate. In the current study, the duration of exploration and the number

of toys infants manipulated were not coded. The time spent exploring could be an indicator of infants' interest and investment in exploring an object (Ruff & Lawson, 1990). Also, the number of toys infants manipulated could provide information about the strategic exploratory behaviors of the infants (Schulz et al., 2019). Future research should also take these variables into consideration.

Finally, although there was variation in SES, most mothers were highly educated. Future studies should focus on sampling more diverse participants from different SES. This unequal distribution may explain nonsignificant moderating effects.

## **5. CONCLUSION**

In conclusion, the present study provides evidence that maternal attention-following and directing behaviors moderate the relationship between SES and infant exploration. Our findings highlight the importance of the moment-to-moment quality of mother-infant interactions and suggest that parenting quality is an effective compensating mechanism when confronted with socioeconomic adversity. Moreover, the lack of a significant direct association between SES and infants' exploration potentially reflects that the relationship between SES and infant development is complex and indirect. Another contribution of the current study was to create a novel coding scheme aiming to measure maternal encouragement of exploration. Although maternal encouragement did not play a moderating role between SES and infant exploration, its subdimensions were associated with infant exploration. Our findings may guide potential parenting interventions to support infant exploration, especially for infants from lower-SES families.

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## APPENDIX A

### Summary of Moderation Analyses

Outcome Variable	Moderator	Model	Moderator
Exploration Frequency	Attention-Directing Frequency	$F(4, 103) = 2.99, R^2 = .10, p = .02$	Not significant ( $B = 0.19, t(103) = 1.27, CI [-0.11, 0.49], p = .21$ )
Complex Exploration%	Attention-Directing Frequency	$F(4, 103) = 2.51, R^2 = .09, p = .04$	Significant ( $B = 0.002, t(103) = 1.97, CI [-0.00, 0.0036], p = .0515$ )
Exploration Frequency	Attention-Directing %	$F(4, 104) = 4.67, R^2 = .15, p = .002$	Not significant ( $B = 0.07, t(104) = 1.07, CI [-0.06, 0.21], p = .29$ )
Complex Exploration%	Attention-Directing %	$F(4, 104) = 1.54, R^2 = .06, p = .20$	Not significant ( $B = 0.0005, t(104) = 1.11, CI [-0.0004, 0.0013], p = .27$ )
Exploration Frequency	Attention-Following Frequency	$F(4, 103) = 3.09, R^2 = .11, p = .02$	Not significant ( $B = -0.09, t(103) = -0.35, CI [-0.59, 0.42], p = .73$ )
Complex Exploration %	Attention-Following Frequency	$F(4, 103) = 2.11, R^2 = .08, p = .09$	Not significant ( $B = -0.09, t(103) = -0.35, CI [-0.59, 0.42], p = .73$ )
Exploration Frequency	Attention-Following%	$F(4, 104) = 3.72, R^2 = .13, p = .007$	Not significant ( $B = -0.14, t(104) = -2.05, CI [-0.28, -0.005], p = .04$ )
Complex Exploration %	Attention-Following%	$F(4, 104) = 3.15, R^2 = .11, p = .02$	Significant ( $B = -0.001, t(104) = -2.29, CI [-0.002, -0.0001], p = .02$ )

Exploration Frequency	Responsiveness	$F(4, 104) = 3.22, R^2 = .11, p = .02$	Not significant ( $B = -0.24, t(104) = -1.17, CI [-0.065, 0.17], p = .24$ )
Complex Exploration%	Responsiveness	$F(4, 104) = 1.19, R^2 = .04, p = .32$	Not significant ( $B = -0.0003, t(104) = -0.25, CI [-0.003, 0.002], p = .80$ )
Exploration Frequency	Encouragement Composite Score	$F(4, 100) = 3.55, R^2 = .12, p = .009$	Not significant ( $B = -1.23, t(100) = -0.62, CI [-5.19, 2.73], p = .54$ )
Complex Exploration%	Encouragement Composite Score	$F(4, 100) = 1.31, R^2 = .05, p = .27$	Not significant ( $B = -0.0004, t(100) = -0.03, CI [-0.03, 0.03], p = .97$ )

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*Note.* In all models, SES was entered as a predictor.

## APPENDIX B

### Moderation Analyses of SES, Maternal Encouragement Dimensions, and Infant Exploratory Behavior

Outcome Variable	Moderator	Model	Moderation
Complex Exploration%	Creating Novel Scenarios	$F(4,100) = 1.22, p = .31$	Not significant ( $p = .90$ )
Exploration Frequency	Creating Novel Scenarios	$F(4,100) = 3.48, p = .01$	Not significant ( $p = .50$ )
Complex Exploration%	Information Giving	$F(4,101) = 1.22, p = .31$	Not significant ( $p = .77$ )
Exploration Frequency	Information Giving	$F(4,101) = 3.33, p = .01$	Not significant ( $p = .41$ )
Complex Exploration%	Offering Novel Objects	$F(4,102) = 2.49, p = .04$	Not significant ( $p = .052$ )
Exploration Frequency	Offering Novel Objects	$F(4,102) = 5.86, p < .001$	Not significant ( $p = .07$ )
Complex Exploration%	Praise for Effort	$F(4,99) = 2.38, p = .05$	Not significant ( $p = .74$ )
Exploration Frequency	Praise for Effort	$F(4,99) = 3.85, p < .01$	Not significant ( $p = .32$ )
Complex Exploration%	Stimulating Questions	$F(4,98) = 2.02, p = .09$	Not significant ( $p = .23$ )
Exploration Frequency	Stimulating Questions	$F(4,98) = 5.19, p < .001$	Not significant ( $p = .25$ )

*Note.* In all models, SES was entered as a predictor.

# CURRICULUM VITAE

Dilara Özalp

## Education

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Master of Arts in Psychology  
*Kadir Has University, Istanbul, Turkey*  
Thesis Topic: “*The Role of Socioeconomic Status and Maternal Behaviors in Infant Exploration*” 2022 - 2025  
Advisor: Assist. Prof. Dr. Berna A. Uzundağ

Bachelor of Arts in Psychology 2018 - 2022  
*MEF University, Istanbul, Turkey*

Bachelor of Arts in Psychological Counseling and Guidance  
*MEF University, Istanbul, Turkey*  
Senior Thesis Topic: “*Do Children Really Think Heteronomous when a Parent Broke a Promise?*” 2017 - 2021  
Advisor: Assist. Prof. Dr. Melike Acar

## Research Presentations

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- Özalp, D.**, Sönmez, A.K., & A. Uzundağ, B. (2025, January 9-11). *Socioeconomic status and maternal behaviors encouraging infant exploration*. Poster will be presented at Budapest CEU Conference on Cognitive Development, Budapest, Hungary.
- Özalp, D.** & A. Uzundağ, B. (2025, January 9-11). *The effect of maternal attention-following on the relationship between SES and infant exploration*. Poster will be presented at Budapest CEU Conference on Cognitive Development, Budapest, Hungary.
- Şen, H., **Özalp, D.**, Uğur, G., & Lucca, K. (2024, June 16-20). *Parental autonomy supporting behaviors and children’s exploratory behaviors across the US and Turkey*. Paper presented at the International Society for the Study of Behavioral Development. Lisbon, Portugal.
- Özalp, D.**, Kiefer, S., Uğur, G., Sancar, B.H., Ateş, S., Selalmaz, E., Uçal, A., Deveci, A. N., Akpınar, B., Karaoğlu, M., Şen, H., & Lucca, K. (2023, March 23-25). *Associations between mothers’ and children’s curiosity in the Turkish context*.

Poster presented at Society of Research in Child Development, Salt Lake City, Utah, USA.

**Özalp, D.**, Kiefer, S., Uğur, G., Sancar, B.H., Ateş, S., Selalmaz, E., Uçal, A., Deveci, A. N., Akpınar, B., Karaoğlu, M., Şen, H., & Lucca, K. (2023, January 5-7). *Associations between mothers' and children's curiosity in the Turkish context*. Poster presented at Budapest CEU Conference on Cognitive Development, Budapest, Hungary.

Kiefer, S. L., Şen, H., Akpınar, B., Smith, B., Deveci, A., Selalmaz, E., Snodgrass, N., **Özalp, D.**, Patel S., Uçal, A., & Lucca, K. (2022, April). *Navigating the explore-exploit dilemma: A cross-cultural examination of 3-6 year olds' own behavioral strategies and enforcement of strategies onto others*. Poster presented at the Cognitive Development Society Meeting, Madison, USA.

**Özalp, D.**, Toplu-Demirtaş, E., Sipahi, E., & Gençtürk, A. (2021, October). *Feminists are men-haters: Developing myths towards feminists scale and testing its psychometrics*. Paper presented online at the meeting of the 22nd International Psychological Counseling and Guidance Congress, Muş, Turkey.

## **Research Experience**

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### **Graduate Research Assistant**

Child and Family Lab

Kadir Has University

PI: Dr. Berna Arslan Uzundag

2022 - 2025

### **Lab Coordinator**

Social Development Lab

MEF University

PI: Dr. Hilal Sen

2021 - 2022

### **Research Assistant**

Lifelong Wellbeing Lab

PI: Dr. Fatih Ozdemir

2020 - 2021

## Teaching Experience

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Teaching Assistant  
Statistics (MAN201) 2023 - 2024  
*Kadir Has University*  
Lecturer: Dr. Berna Arslan Uzundag

## Internships

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**Intern,** Psychological Counseling Department,  
Robert College, Istanbul, Turkey 2020 - 2021

**Intern,** Korto Psychology, Istanbul, Turkey  
January - February 2021

**Intern,** Human Resources Department,  
Ekici Inc., Antalya, Turkey Summer 2020

**Intern,** Psychological Counseling Department,  
IELEV Schools, Istanbul, Turkey 2019-2020