# The Impact of Interpersonal Interaction vs. Technology on Preschool Development:

# Literature Review

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# The Impact of Interpersonal Interaction vs. Technology on Preschool Development Abstract

For centuries, human beings were members of kins and multigenerational households. This type of close-knit family structure allows for enrichment by providing a stable support-system for development while assimilating children into their socio-cultural environments. Mechanisms of communication and interaction -- such as storytelling and scaffolding -- promote much of the learning process described in Vygotsky's sociocultural theory. Based on the presence of technological advances and the global impact of the pandemic (COVID-19), many regions have become increasingly dependent on technology as a means of social connection and learning. Accordingly, human beings are facing disequilibrium as our societies are rapidly evolving compared to the former, natural evolutionary pace of the human species. This concept, known as evolutionary mismatch, is responsible for the disconnect between human beings and their biologically driven developmental needs. However, while some critics solely preach the negative effects of technology on child development, it remains critical that future generations become equipped with the necessary skillsets that allow them to grow into successful and productive members of technology-driven societies. More research must be conducted in order to understand a means in which both interpersonal and technology-based learning can be integrated alongside one another to promote positive development. This literature review will provide an overview of the positive and negative effects of interpersonal interactions vs. technology on the development of preschool aged children, as well as future implications on how both can be balanced to promote development.

*Keywords:* Technology, interpersonal relationships, preschool, COVID-19, evolutionary mismatch

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# Introduction

Lev Vygotsky's theory of cognitive development posits that children are shaped by their social experiences, social groups, and their cultural environments; and his transactional perspective emphasizes the role of social interaction on cognitive development (Bornstein et al., 2014). Parents are the first of many tools a growing infant uses to assimilate into their culture by providing learning opportunities as children begin to explore their environments. Parental guidance and responsiveness are especially crucial in the first few years of a child's life. According to Bornstein et al., (2014), the Specificity Principle describes critical periods of early development where specific forms of parenting affect an infant's growth in specific ways. During these periods, different mechanisms of caregiving can be used in infant-caregiver interactions to establish a secure basis for attachment, learning, and exploration.

Rochanavibhata & Marian (2020) explain how parental scaffolding during preschool years have significant influences on academic achievements later in life. As a child moves into preschool, the skills they developed in their first few years provide them with a foundation to continue learning alongside teachers and peers. However, the presence of technology in rapidly evolving technological societies has led to controversy in the realm of education and child development. Still, potential risks of technology use on development are combatted by claims noting the value of technology and the positive educational outcomes that are associated with it. The purpose of this literature review is to examine the effects of interpersonal interaction vs. technology use in early childhood, and my review will be broken down into 3 sections: interpersonal interactions, evolutionary mismatch, and the influence of technology on development. Through this synthesis, it is my intention to better understand how technology and interpersonal interaction may coexist to produce optimal developmental outcomes in young children.

# **Review of Literature**

# **Interpersonal Interactions on Development**

The existence of interpersonal relationships and experiences are present from the moment an infant enters the world. Beginning with the mother, caregivers provide newborn children with some of their earliest opportunities for attachment and learning. The narrative skills a child develops by interacting with their caregivers serve as important indicators of literacy and success in school, and are associated with "increased memory, larger vocabulary, and better print awareness" (Rochanavibhata & Marian, 2020).

# **Cross-Cultural Attachment and Caregiving**

It is necessary to acknowledge the differences in cultural caregiving practices based on respective social norms and values (e. g. collectivist vs. individualist) to better understand their unique impacts on learning. Rochanavibhata & Marian (2020) studied book sharing practices of both American and Thai mothers alongside their 4-year-old, preschool aged children. Data was collected through a mother-child reminiscing task as well as a personal child narrative assessment. It was found that American mothers use more descriptions, affirmations, and extensions compared to Thai mothers: who demonstrated low-elaborative style by using requests for action and repetition (Rochanavibhata & Marian, 2020). By examining cultural-specific communication styles in mother-child dyads, this study found that American children produced longer narratives during the personal narrative assessment task. Nonetheless, activities such as book sharing allow for early social facilitation and language development in preschool aged children (Rochanavibhata & Marian, 2020). While differences in socialization exist based on

cultural norms and values (e. g. interdependence vs. independence, group harmony vs. individual expression, etc.) parental scaffolding interactions are a universally crucial element for the assimilation of a child into their culture.

# Scaffolding

Parent-led reading can provide children a stable base for the exploration and processing of new stimuli. Another study by Zivan & H.-K (2020) on joint parent-child reading in preschool children presents quantitative evidence in support of these findings. After conducting cognitive assessments for each child (4-6 years) researchers measured fixation using an eye-tracking device during joint storytelling, led by either the parent or experimenter. Analyses revealed increased fixation during the parent reading condition and a positive relationship between print awareness and cognitive skills (Zivan & H.-K, 2020). These results show how parent-child reading activities promote advances in development, and why it is necessary for parents to cultivate supportive, learning environments for their children.

## **Preschool interactions and COVID-19**

Furthermore, enriching relationships throughout preschool years have been seen to predict achievement later in life. A longitudinal study by Torres et al., (2015) demonstrates the crucial role of interpersonal experiences on early learning, as preschool children enter kindergarten. This study assessed 4-year-old children (N= 164) at the beginning and end of the preschool year before elementary school, as well as at the end of kindergarten. Student-teacher closeness and positive social interaction with peers was recorded and the emotional knowledge of each child was assessed, based on visual and emotional recognition tasks (Torres et al., 2015). This study highlights the positive impact of high-quality interpersonal relationships with teachers and peers on early socio-emotional development. By providing security to students teachers may simultaneously support interpersonal engagement, which can lead to increased perspective taking skills and empathy (Torres et al., 2015).

Even so, the COVID-19 pandemic dramatically altered early childhood education by increasing distance learning through virtual platforms, and heightening pandemic fears in preschool aged children. Bookser et al., (2021) used factors of context, fear, and racial stereotypes to examine preschool responses to behavior and discipline decisions; based on three vignettes about a Black boy's behaviors in a make-believe virtual classroom or typical classroom condition. To eliminate any sources of bias, it is important to note that majority of the students participating in this study were racially/ethnically minoritized or multiracial (83%). The results of this study unveil the unfortunate effects of the pandemic on preschool learning, fear, and aggression. The virtual classroom condition alongside fears associated with COVID-19 resulted in increased feelings of discipline, in response to the Black vignettes. For this reason, it is necessary to acknowledge evolutionary mismatch perspectives when studying the effects of interpersonal interactions vs. technology use on development.

#### **Evolutionary Mismatch**

Social relationships have provided opportunities for learning in early childhood since primitive times. According to the novel *Mismatch*, our human ancestors spent most of their time in the presence of close and distant relatives or kin-members (Giphart & van Vugt, 2016). These existing social networks provided youth with support-systems, protection, and experiential learning opportunities for much of history. It is only recently that our societies have begun to shift away from these close-knit systems as we move towards increasingly individualized, technology-based lifestyles.

# **COVID-19** and the Mismatch Perspective

Due to the recent COVID-19 pandemic, societies worldwide are increasingly turning to technology as a means of social connection and education. Humans have not evolved rapidly enough to acclimate to these new ways of life, which has led to the creation of the term evolutionary mismatch. Evolutionary mismatch refers to the difficulty human beings face as they adapt and respond to rapid technological changes (Li et al., 2020). According to a study conducted in Turkey by Genc (2014), "6% of two to five year old children have their own smartphone, and this percentage is rising dramatically in developed nations every year." Based on a research synthesis evaluating evolutionary mismatch and the use of smartphones and social behaviors, Sbarra et al., (2018) discuss how smartphone use may alter attentional resources that are needed for cognitive processes, ultimately leading to disruptions in overall health and wellbeing. Based on this concept, it is now necessary to examine the impact of technology on developmental outcomes.

#### **Impact of Technology on Development**

The growing influence of technology on societies and future generations is inevitable. Therefore, understanding the accessibility and consequential effects of technology use on young children is necessary for caregivers and educators worldwide.

## Technology in the Household

Lepicnik-Vodopivec & Samec (2013) conducted a pedagogical research study utilizing a questionnaire to examine the effects/ interaction of preschoolers with communication technologies (ICTs) in their households. According to the questionnaire results, almost every family had a television (99.2%), a mobile phone (98.5%), and a computer (94.6%) (Lepicnik-Vodopivec & Samec, 2013). According to parents, "ICT develops: motor competences (53.8%),

learning competences (58.5%), language competences (49.2%), self-expression competences (53.8%), social competences (42.3%) and cultural competences (51.5%)" (Lepicnik-Vodopivec & Samec, 2013). While many adults worry of the negative consequences stemming from technology use, the results of this article demonstrate the unified opinions of parents on child ICT use. Contingent upon these beliefs, it can be proposed that ICTs allow preschool aged children to become competent, active members of their digital society.

Similarly, research by Genc (2014) about mobile technology use of preschool agedchildren suggest that with moderation, digital technology games use can support cognitive and social skills by allowing children to tap into their creativity and executive functioning skills. However, it is still up for debate whether technology prevents children from becoming culturally enriched, interactive members of society.

Many caregivers and educators believe technology prevents socio-cultural assimilation because it is a distraction. For example, Carson & Kuzik (2021) conducted a study evaluating parent-child technology interference on cognitive and social-emotional development based on the use of six different devices (e. g. cellphone/smartphone, tablet, iPod, television, computer, and video games). The use of electronic devices was seen to interfere with parent-child daily activities 12-16 times a day, and over half of these interruptions were due to mobile devices. Additionally, high parent-child technology interference was associated with low levels of executive functioning, low self-regulation, and higher behavioral problems (Carson & Kuzik, 2021). Based on the outcomes of online surveys administered by Zayia (2021), the developmental consequences of frequent techno-interference can be seen to disrupt attachment and social skills as children get older. The discoveries of these empirical studies shed light on the developmental threats resulting from increased instances of parent-child technology interference.

# Technology in the Classroom

It is also important to evaluate the presence of technology as it exists in early childhood educational environments. Storytelling is an evolutionary significant activity that reinforces interpersonal interactions through development of language, expression, logic, imagination, and creativity (Fridin, 2014). The implementation of a storytelling, assistive robot allowed Fridin (2014) to observe the benefits of technological tools in in a preschool/kindergarten education setting. The robot had a child-like voice, emotions, and moved as it told the stories. The intervention was seen to increase emotional involvement in the learning process by achieving "what a human teacher cannot" by providing feedback uniquely tailored to each child (Fridin, 2014).

In another study, Baccaglini-Frank & Maracci (2015) explore the number-sense development of Italian preschoolers based on the multi-touch potential of two iPad applications (*Ladybug Count* and *Fingu*). The implementation of this learning intervention allowed children to learn on iPad games while being supported by peer groups; and the results validate the hypothesis that multi-touch technology allows for the development of number-sense in preschool aged children. This article offers important findings to researchers and educators by demonstrating how iPad use in classrooms can encourage number-learning and teamwork. While digital technology devices can be used to assist learning by enhancing mental representation in young children, the effects of screen vs. live learning must be accounted for.

# Effects of COVID-19 on Learning

Sonnenschein et al., (2021) state that "macro-level crises, such as the COVID-19 pandemic, can and do have long-lasting effects on children's development". A multitude of research on infant imitation from television has demonstrated support of the video-deficit effect, which states that children learn less from television and 2D images than from live, interpersonal interactions (Zack et al., 2009). These findings offer extremely important implications to present- day child development studies as societies adjust to life after the pandemic. The nationwide school closures, quarantine mandates, and virus outbreak have resulted in many early childhood educators moving to remote learning platforms.

Survey results from over a thousand early childhood teachers in a study by Steed & Leech (2021) highlighted mechanisms teachers use to keep their students engaged during remote learning. Teachers would provide sing songs/read stories, share learning activities with families, and send families information to assist parent-child relationships during the pandemic (Steed & Leech, 2021). Teachers would also host both individual and group meeting with students throughout the year. Despite these attempts to combat isolation and support learning, teachers expressed difficulty maintaining contact with families, trouble using technological software for online classes, lack of support from administrators, and longing for in-person interactions (Steed & Leech, 2021).

Teachers were not only the caregivers struggling to adapt to the changes of the pandemic, however. Due increased stressors associated with the pandemic on parental well-being, a survey was conducted in the United States to assess parental involvement during distance learning. The survey results showed that parents are significantly less likely to offer communication (9%) or emotional support (10%), compared to monitoring (63%) and teaching (65%) (Sonnenschein et al., 2021). Based on these studies, it is apparent that many parents and teachers have struggled to provide optimal support-systems for young children amidst the pandemic and the virtual shift associated with it.

# Conclusion

Based on the information presented in this literature synthesis, I believe providing enrichment through interpersonal communication remains fundamentally vital to natural development when ensuring positive outcomes of our future generations. Children are inherently responsive to communication and learning during face-to-face interaction with their parents, caregivers, and teachers. It can be safely concluded that the first few years of a child's life, or formative years, should be spent promoting attachment, verbal/physical interaction, and environmental exploration.

Nonetheless, despite some of the negative associations of technology on development it is difficult to disregard the value it can bring to early childhood settings. Technology allows for global connectivity and access to a plethora of resources that can be used to promote learning experiences, even during times of isolation, such as the height of the pandemic. Moreover, the fourth year of life is the start of a crucial developmental period where young children can begin to learn how to operate in a digital society (Lepicnik-Vodopivec & Samec, 2013). It seems highly possible that children can have a healthy relationship with technology if caregivers moderate its interference during other activities. Additionally, technology should be used safely and should never outweigh the presence of physical, active, real-life activities that promote growth and development.

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