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Nonverbal interaction between adults and young children during digital and real object play

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Abstract

This study explored the developmental play behaviors and use of nonverbal communication of children that are raised in homes that differ in the amount and kind of digital exposure they have experienced within the first three years of life. Thirty minute videotaped play sessions of seven different children ranging in age from 20 to 30 months who were categorized as having low digital exposure in the home, TV exposure only, or high digital exposure based on a digital use questionnaire completed by parents were coded for the contribution of eye gaze, body positioning, and hand movement engagement to negotiate play with real and digital objects. Average instances of eye gaze and body positioning were higher in the physical toy condition than in the digital toy condition, regardless of the children's exposure to digital technology in the home. Average hand movement engagement for children in the low digital exposure group was higher when playing in the digital toy condition compared to the physical toy condition. It was essentially uniform in the physical toy condition and in the digital toy condition for the children in the TV exposure only and the high digital exposure groups. Results suggest that during play with digital toys, the amount of eye gaze and changes in body positioning displayed by the children were significantly decreased compared to physical toy play, regardless of the extent of digital exposure in the home. The average use of hand movement engagements, however, was acutely similar for physical and digital toy play conditions across all children.

Nonverbal Interaction between Adults and Young Children during Digital and Real Object Play

People often consider the bulk of the information we receive through human interaction as coming by way of speech and verbal language. The majority of what we say is not verbal at all. People use a combination of body posture, gestures, eye movements, and facial expressions to communicate emotions, intentions, and meaning. These nonverbal aspects of communication have a biological purpose early on, for example, to bond mothers to their infants and infants to those who care for them. Newborns are attuned to their mothers at birth (Bråten, 2008) and by four months of age the rooting reflex for nursing is paired with eye contact (Beier & Spelke, 2012). This is the beginning of social gaze that becomes a mutual way to communicate without, or in addition to, words by the second year of life. Social engagement is pivotal to cognitive development of the young child (Als, 1979), and play is a developmental activity that frames such engagement (Rogoff, 1990). The understanding and use of nonverbal aspects of communication expand and become increasingly sophisticated as children engage in play before three years of age. Digital technology is prevalent in today's society, and in varying degrees surrounds children younger than 36 months, yet little is known about how this technology may be influencing children's social and cognitive development. The research on the development of young children who are being raised in families who differ in their beliefs about using digital technology before the age of three years is just emerging. The purpose of this study is to examine the nonverbal interactions of such young children during play in order to better understand the impact of digital exposure on development.

Review of the Literature

This review of the literature provides the research background upon which the current study is based. The topics covered include an overview of the cultural aspects of nonverbal

communication, the development of nonverbal communication, play as a specific aspect of development, and technology, play, and interactions. The review concludes with the specific questions of the study.

Culture and Nonverbal Aspects of Development

Although it has been believed that a universal set of facial expressions, explicitly the expressions of happiness, sadness, and anger, exists throughout cultures (Ekman, 1971; Ekman & Friesen, 1971), research on the universality of facial expressions conducted by Marsh, Elfenbein, and Ambady (2003) suggests otherwise. Their research reveals that people could more accurately identify the nationality of a person when viewing that person displaying emotional facial expressions as opposed to neutral facial expressions. Further research suggests that people can use nonverbal communication to accurately distinguish cultures from one another, and they even assign nonverbal communication usage to fit subjective cultural stereotypes (Marsh, Elfenbein, & Ambady, 2007). The results of these studies support the idea that nonverbal communication variations, referred to as 'accents,' exist across cultures.

The awareness of nonverbal communication 'accents' across cultures has been used to dispute the notion of a strictly universal display of emotional facial expressions. A more accurate and all-encompassing explanation would be that underlying universal nonverbal communication cues exist; yet distinct accents in nonverbal communication do exist within cultures (Elfenbein & Ambady, 2003). Just as linguistic accents place more inflection on specific aspects of a language and vary between cultures and geographical regions, in the context of nonverbal communication, accents make up the subtle variations in how emotion is portrayed and received amongst people of different cultures (Elfenbein & Ambady, 2003). Accents may only serve to add variety to nonverbal communication expression, but if severe enough, they could result in the breakdown

of communication during social interaction (Elfenbein, 2013).

The debate on whether there are universal facial expressions or accents within cultures has stemmed from a nature versus nurture discussion. It is clear that social cognition and interpretation of nonverbal social cues such as facial expressions, gestures, and eye contact are honed beginning in infancy. Within a few days of birth, infants can exhibit facial recognition abilities, although they are rudimentary and take years to fully develop. This indicates that an innate biological system for recognizing and conveying facial expressions of emotion exists from birth (McKone, Crookes, & Kanwisher, 2008). Further research has even demonstrated that recognizing facial expressions may be influenced by a genetic component (Lau, Burt, Leibenluft, Pine, Rijsdijk, Shiffin, & Eley, 2009). Eye gaze, as a form of nonverbal communication, is a biological construct, as exhibited by mirrored facial expressions in newborns and learning by imitation (Bråten, 2008). In congruence with emotional facial expressions, the brain processes information gleaned from eye gaze, such as who is in our line of focus and their intentions of emotion, rapidly and unconsciously (Frith, 2009). This suggests an innate mechanism for processing nonverbal communication information. A study conducted by Pollak and Kistler (2002) demonstrated that disruptions in social environments that violated cultural standards of care, such as those endured by abused children, can alter inherent facial expression portrayal and recognition mechanisms. Therefore, fundamental abilities of facial expression discernment can be altered due to experience and environment, thus resulting in cultural accents in nonverbal communication.

Facial expressions are vitally important to efficient human interaction because of the amount of pertinent social information that they provide about a social partner, such as the social partner's emotional state, disposition, intentions, and the focus of the social partner (Emery,

2000). People can even detect traces of deception by scrutinizing facial expressions and nonverbal behavior (Vrij, Edward, Roberts, & Bull, 2000; DePaulo, Lindsay, Malone, Muhlenbruck, Charlton, & Cooper, 2003; Swerts, van Doorenmalen, & Verhoofstad, 2013).

Developmental Aspects of Nonverbal Communication

In order to respond appropriately to a social cue, the listener must be able to glean necessary information from the facial expressions of the speaker. Early exposure to a variety of facial expressions can promote the establishment of purposeful intersubjectivity, a crucial key to social interaction (Trevarthen & Aitken, 2001). The decade of research on intersubjectivity reviewed by Trevarthen and Aitken suggests that facial expressions as a whole are important to interpersonal interaction, and that eye contact and eye gaze are inherent features of human connectedness that are apparent from infancy. Therefore, the eyes provide critical cues for engagement and are given the most attention in social situations in many cultures.

Display and recognition of facial expressions emerge developmentally. Prior to the complete development of facial expression recognition, infants' attention to eyes and eye gaze provides them with information about the emotional contexts of human interaction. Eye gaze can be linked to focus of attention, turn taking, intentions, and directedness. Even as early as three months, infants are sensitive to eye contact and its relevance as a social cue to human interaction (Striano & Reid, 2006; Pelphrey, Singerman, Allison, & McCarthy, 2003). After the development of facial expression recognition is complete, usually well into adolescence, the eyes continue to provide the most information concerning emotional expression and social cues. Young children respond quicker and more consistently to eye gaze than to facial expression (Taylor, Edmonds, McCarthy, & Allison, 2001). This illustrates that with regards to infant and

early child development of social cognition and human interaction, eye gaze is an instrumental aspect of connecting with infants and young children through nonverbal expression.

Yu and Smith (2013) have focused on other aspects of nonverbal communication in infancy. Stemming from early research with Thelen (Thelen & Smith, 1996) that examined the contribution of motoric action on the development of cognition, Smith and Yu have more recently completed a series of studies that suggest young children engage by following the movement of hands rather than eye gaze. This is not to say that eye gaze is not important in developmental processes, but rather that the gaze may be more directed toward the actions conveyed by the hands of the adult in social play situations. This argument is consistent with the social interactive approach to development outlined by Trevarthen and Aitken (2001) as well as other developmentalists such as Brunner (1964) and Rogoff (1990).

Play as Cognitive Development

Play is considered a major activity of young children that begins in infancy in order to build cognition. Piaget (1962) detailed a biological account of play in development that recognized it as the essential step from early imitation to later symbolic representation. His numerous studies of young children formed the early basis for considering play a vital component in early cognitive development. Social interactionists such as Leontyev (1981) and Lisina (1985) agreed with Piaget's assertions about the importance of play, but situated it socially rather than biologically. In other words, they claimed that play is an essential aspect of child development that reflects cognitive change, but play for the young child is primarily social and situated in the activities that others bring to the interaction.

Research on play from these early theoretical beginnings has expanded over the last fifty years. While studies may focus on one of these two developmental mechanisms over another,

there is little debate that an infant's readiness to engage in play, even in its simplest form, has a biological unfolding that is highly social and interactive with the objects provided by adults within particular cultures (Rogoff, 1990).

Technology, Play, and Interactions

Recent technological advancements in toys can stimulate the imagination and encourage creativity in young children in new, modern ways (Yelland, 1999). In order to be beneficial, the toy should remain strictly a supplemental tool that enhances the social interaction, and never act as a substitute for face-to-face play (Luckin, Connolly, Plowman, & Airey, 2003). It is important, especially for children three years and younger, to be exposed to and interact with others in order to spur cognitive and social development. Play activities for younger children have been viewed as a physical experience. Young children learn through movement, and digital toys that are often heavy and breakable may limit tactile stimulation of the child through play. Improvements to digital toys such as easier manipulation and tangible surfaces now simulate physical action as children play (Plowman & Stephen, 2003). As digital toys gain prominence in the play environments of young children, additional research needs to be completed to determine relationships between the effects of digital play on the development of interpersonal skills in children (Subrahmanyam, Greenfield, Kraut, & Gross, 2001).

It is important to assess the extent to which the use of digital toys may alter the facial expressions and use of eye gaze in young children during play interaction. In a study conducted by Wooldridge and Shapka (2012), the mother-infant interactions of 25 dyads were observed during play with digital toys and physical toys. The researchers found that while playing with digital toys, a child's use of language and verbalizations significantly decreased. Additionally, when the digital toys were introduced, a significant lack of initiated pretend play by the mothers

was observed. The major findings of the study concluded that overuse of digital toy play could result in significant deficits in the areas of language input and output, conversational turn-taking, role playing, and parent-child interactions. Playing with digital toys may ultimately interfere with a child's development of language and social interaction skills. A similar study involving seven children between the ages of 20 and 30 months of age presents a contrast to these data. Smith (2014) used primitive speech act coding of video data in which the children from different digital home environments played with real and digital objects. This data, coded for primitive speech acts displayed verbally, vocally, and/or nonverbally, revealed no pragmatic differences between the groups. This suggests that the question of how technology might impact early language development is more complex than expected at first glance.

The pervasiveness of digital play in current US culture has been a topic of research for the last decade (Gee, 1996), while research that focuses on digital play in very young children is just emerging (Yu & Smith, 2013). A key aspect of this research includes the use of technology in homes and how the exposure to this may change the development of interactions, exploration associated with play, and ultimately, the cognitive development of children. The pace of research is not keeping up with the everyday uses of technology that inform the habits and beliefs of parents. Therefore, a continuum of parental behaviors and beliefs has emerged. At one end are parents who limit their young children's use of digital technology, and at the other those who freely share such technology with their children from the earliest months of life. Each of these types of homes can be understood as different cultures or subcultures coexisting in post-modern America. It is unknown how the activities of child rearing and subsequent social development of young children living in a spectrum of digital homes will change the lives of children. A review of current understandings about cultural differences and nonverbal development may provide

keys to understanding the possible impact of growing up with a digital rather than social interactive focus.

Summary and Questions of the Study

This review of the literature suggests that nonverbal communication is a developmental phenomenon that relies on biological triggers such as eye gaze and facial recognition in the beginning stages of life. Nonverbal communication increasingly becomes socially and culturally bound in the first years of a young child's life. The review also suggests that play is something that all children partake in beginning in infancy, but the activities of play vary by cultures, which could be defined on a broad spectrum from broad cultures of nationality to more specific subcultures within a society. Households where children grow up without access to digital toys and households where children do grow up with access to such toys can be understood as two subcultures within today's society. The purpose of this study was to examine the nonverbal interactions of such young children during play in order to better understand the impact of digital exposure to development. Specifically, this study explored the developmental play behaviors of children that are raised in homes that differ in the amount and kind of digital exposure they have experience within the first three years of life.

Specific Questions of the Study

1. Do children from digital versus traditional homes differ in their use of eye gaze to establish/maintain interaction during play with real versus digital objects?
2. Do children from digital versus traditional homes differ in their use of body positioning to signal interaction during play with real versus digital objects?
3. Do children from digital versus traditional homes differ in their use of hand movement engagement during play with real versus digital objects?

Methodology

Materials

Two kinds of materials were used in this study, a de-identified developmental and digital-use parent questionnaire and archived de-identified videotaped data of child-adult play. The parents of each of the children completed the questionnaire that included the age of the child and developmental milestones, as well as the kinds of technology present in the home and its use by the children (see Appendix A). The second type of data consisted of videotapes of seven children raised in homes that were identified by parents as high digital or low digital environments. Each videotaped session was thirty minutes in length, with approximately fifteen minutes spent in play with real and digital toys, respectively. An adult non-family member and child were the only participants in each of the videotaped segments. The toys used in the videotapes consisted of the Fisher-Price® Little People® Apptivity™ Barnyard set with enclosed iPad that could be turned on for digital play.

Procedures

The de-identified archived videotaped sessions were coded using Dore's Primitive Speech Acts (Dore, 1975) for changes in interaction that were signaled nonverbally (see Appendix B). Each videotape was viewed in its entirety without coding. Following this review of all of the video data, the videotapes were then viewed for coding. The sound was turned off to allow the researcher to focus on the nonverbal aspects of the interactions. The videotapes for each child were coded three times, once for use of eye gaze to initiate change or respond to interactions with the adult, once for changes in body positioning to signal changes in interaction, and once for use of hand movement to progress interactions and play activities.

Analysis

The developmental and digital parent questionnaire was used for the first analysis. This consisted of self-reporting the use of technology and its prevalence in the home environment, reporting of availability and use of technology in the home, and the parents' identification of child-rearing preferences and practices. The remaining analysis consisted of a comparison of the kinds of nonverbal communication used as interactive functions when participating in the two kinds of play; i.e. object and digital play.

Results

Demographics

Archival video data that was used in the study contained footage of seven children during individual 30-minute play sessions. The families were from middle-class, Caucasian, English-speaking homes in the Northwest Arkansas area. A parent from each family completed a questionnaire that provided background information about the child's technology use, digital exposure in the home, and developmental history.

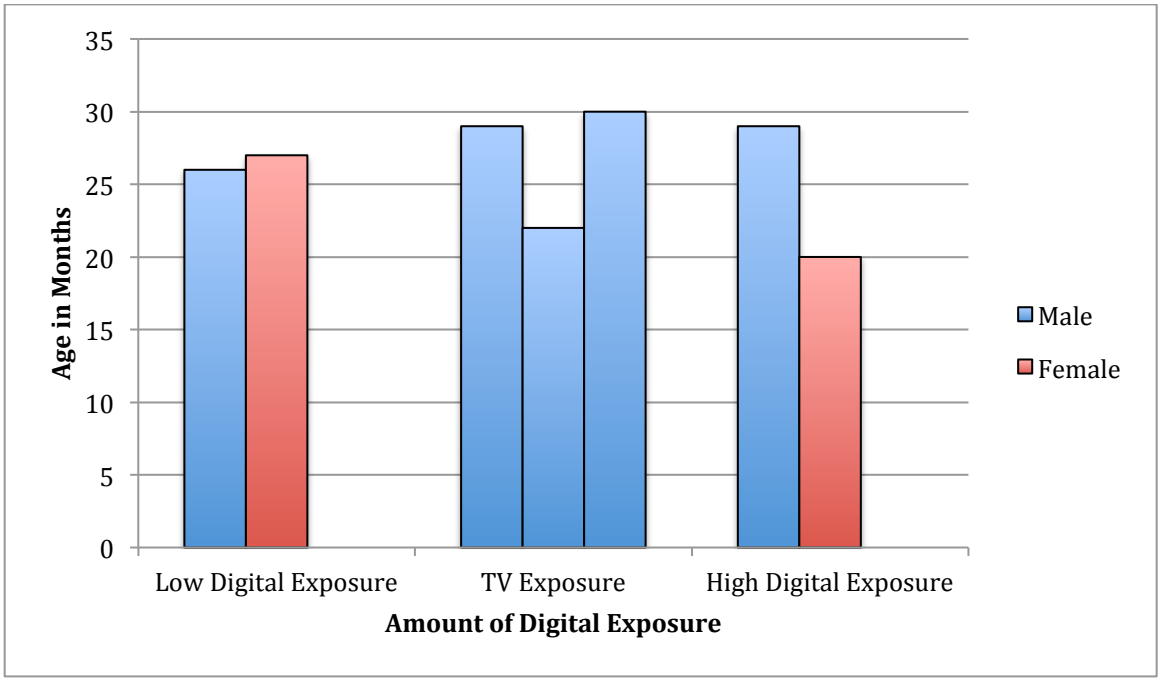
The digital use questionnaire completed by the parents that contained no identification information was used to categorize the digital exposure status of the children in the study. Eight forms of digital technology were included on the questionnaire: smart phone, tablet, desktop computer/laptop, gaming consul, handheld gaming device, television, video camera, and still camera. The children were divided into groups based on the amount of digital exposure in their home environment. After reviewing the data reported by the parents in the digital exposure questionnaire, a third category emerged in addition to the high digital and low digital exposure categories. Children that were not exposed to digital objects in their home environment yet had significant hours of TV exposure were placed in the TV exposure only category.

The low digital exposure group consisted of one male child and one female child, ages 26 months and 27 months, respectively. According to the digital use questionnaires, low digital children spent an hour a week total engaging with different forms of digital technology in their homes.

The TV exposure only group consisted of three male children, ages 22 months, 29 months, and 30 months. The children in this category had limited digital exposure except for their exposure to TV, which was averaged 10 hours a week between the three children.

The high digital exposure group consisted of one female child and one male child, ages 20 months and 29 months, respectively. The high digital group was most commonly exposed to and had experience with smart phones, tablets, a desktop computer/laptop, and television. The average digital technology use averaged 7 hours a week between the two children. The demographics are summarized in Table 1 below:

Table 1. Age, gender, and digital exposure level of the children in the archived videos.



Video Content

The seven archival videos consisted of each child playing with physical toys for fifteen minutes and with digital toys for the following fifteen minutes. Physical toy play data was collected using the Fisher-Price® Little People® Apptivity™ Barnyard play set. An iPad contained in the base of the play set with a previously downloaded interactive Little People® Barnyard application was subsequently turned on and activated in order to collect digital toy play data. The video data was coded to answer the questions of the study.

Coding

The number of cues of eye gaze, body positioning, and hand movement for each child was coded during the digital and physical toy play conditions (See Apendix A for coding protocols).

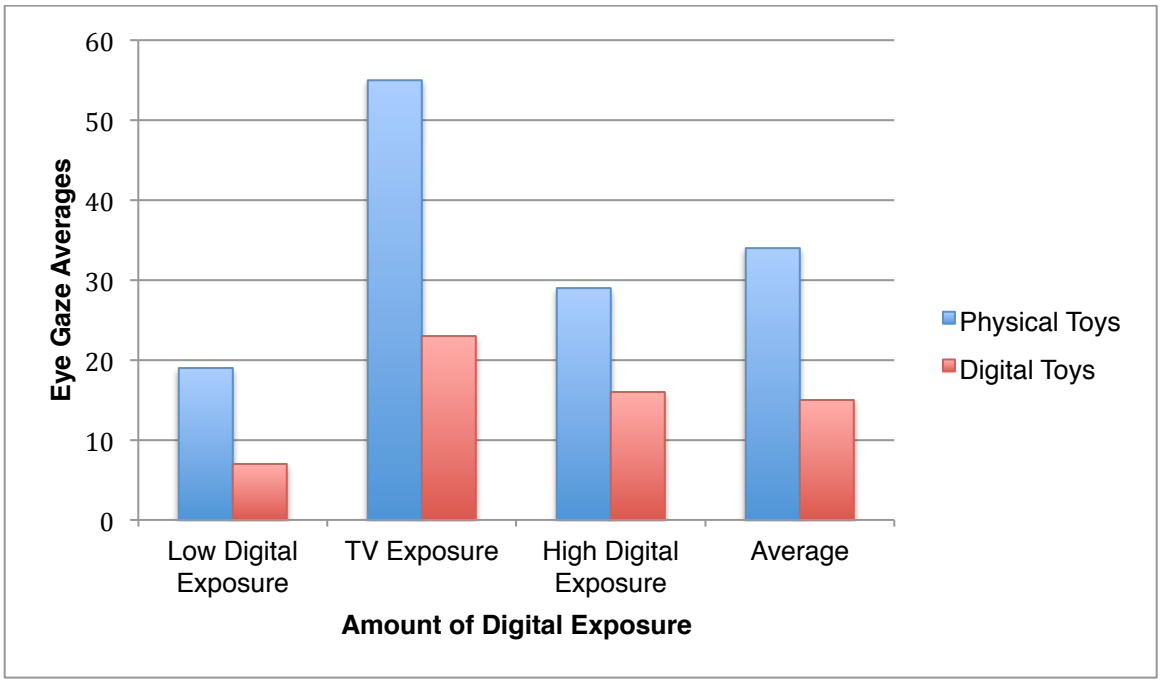
Question One

The first question of this study asked if children from digital versus traditional homes differed in their use of eye gaze to establish/maintain interaction during play with real versus digital objects. To answer this question, each instance of the children's use of eye gaze during both play conditions was recorded to determine an average for each child. Furthermore, each eye gaze cue was categorized using the modified version of Dore's Primitive Speech Acts to gain a better understanding of the information the children were trying to convey through nonverbal communication.

Average instances of eye gaze were higher in the physical toy condition than in the digital toy condition regardless of the children's exposure to digital technology in the home, i.e., low digital, high digital, and television. The low digital exposure children used the least amount of eye gaze cues in comparison to the other two groups, 19 cues for physical toy play and 7 cues

for digital toy play. The TV exposure only group had the highest number of eye gaze cues out of the three groups, with 55 occurrences for the physical toy play condition and 23 occurrences during the digital toy play condition. The high digital exposure group's use of eye gaze was the closest to the average of all three groups, with 29 eye gaze cues in the physical toy play condition and 16 eye gaze cues in the digital toy play condition. Between the three groups, on average there were 34 eye gaze cues during physical toy play and 15 eye gaze cues during digital toy play. The amount of eye gaze cues used during physical toy play was more than two times the average number of cues used during digital toy play across all three categories of digital exposure. Table 2 below displays this:

Table 2. Average eye gaze cues for three child categories in two play conditions.

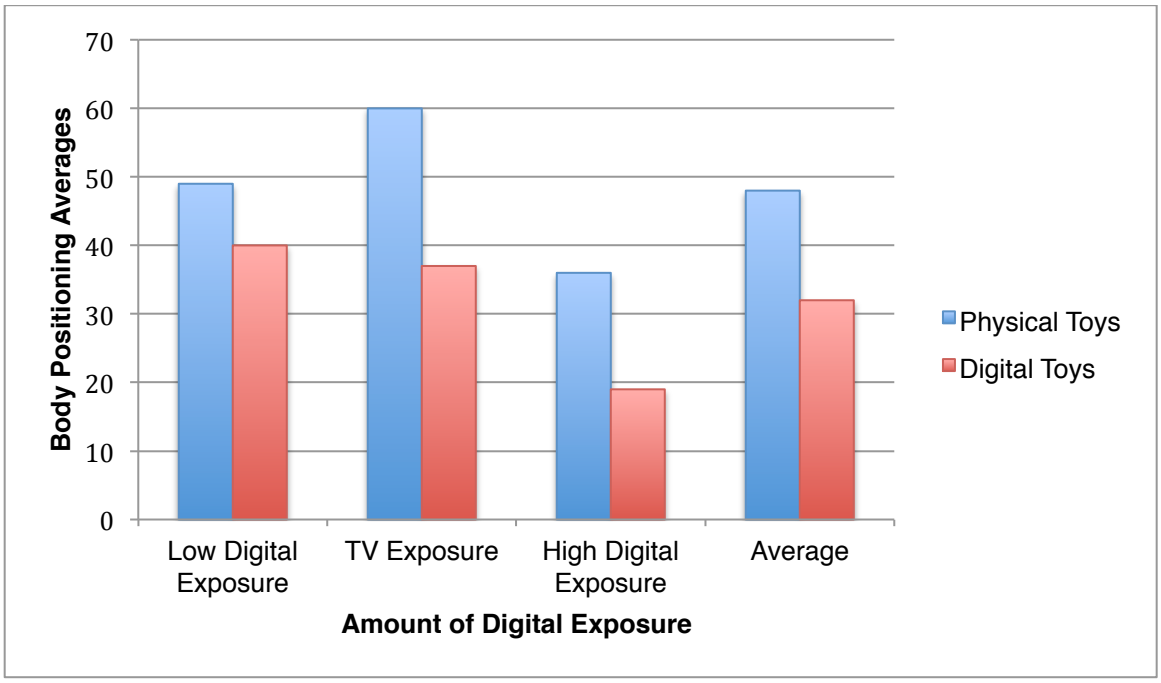


Question Two

The second question of the study asked if children from digital versus traditional homes differed in their use of body positioning to signal interaction during play with real versus digital objects. To answer this question, each instance of body positioning during both play conditions

was recorded to determine an average for each child. Average instances of body positioning were higher in the physical toy condition than in the digital toy condition, regardless of the children's exposure to digital technology in the home. The low digital exposure group displayed 49 body position cues during physical toy play and 40 cues during digital toy play. Once again, the children in the TV exposure only group had the most body position cues during physical toy play, with 60 cues. The children displayed 37 cues during digital toy play. The children in the high digital exposure group displayed the least amount of body position cues out of the three groups, with 36 instances for physical toy play, and 19 instances for digital toy play. On average, the seven children displayed 48 body position cues during physical toy play and 32 body position cues during digital toy play. Table 3 below displays this:

Table 3. Average body positioning cues for three child categories in two play conditions.

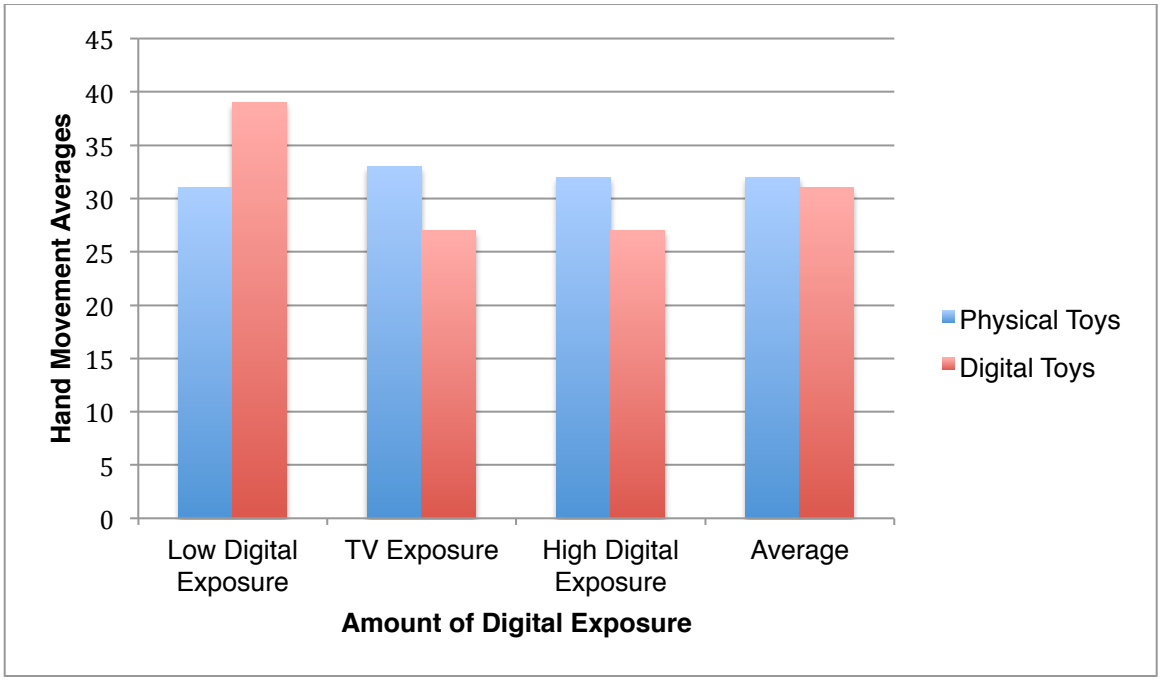


Question Three

The third question of this study asked if children from digital versus traditional homes differed in their use of hand movement engagement during play with real versus digital objects.

To answer this question, each hand movement during both play conditions was recorded to determine an average for each child. Average hand movement instances for children in the low digital exposure group were higher when playing in the digital toy condition, 39 instances, compared to the physical toy condition, 31 instances. The children in the low digital exposure group also used the most hand movement cues during digital toy play out of the three groups. Average instances of hand movement were slightly higher in the physical toy condition than in the digital toy condition for the children in the TV exposure only and the high digital exposure groups. The TV exposure only children displayed 33 hand movement cues during physical toy play and 27 hand movement cues during digital toy play. The high digital exposure hand movement averages were almost identical to the TV exposure group averages, with hand movement cues for the physical toy play being one less at 32 cues. The average number of instances when combining all three digital exposure categories was 32 instances in the physical toy condition and 31 instances in the digital toy condition. Table 4 below displays this:

Table 4. Average hand movement engagement for three child categories in two play conditions.

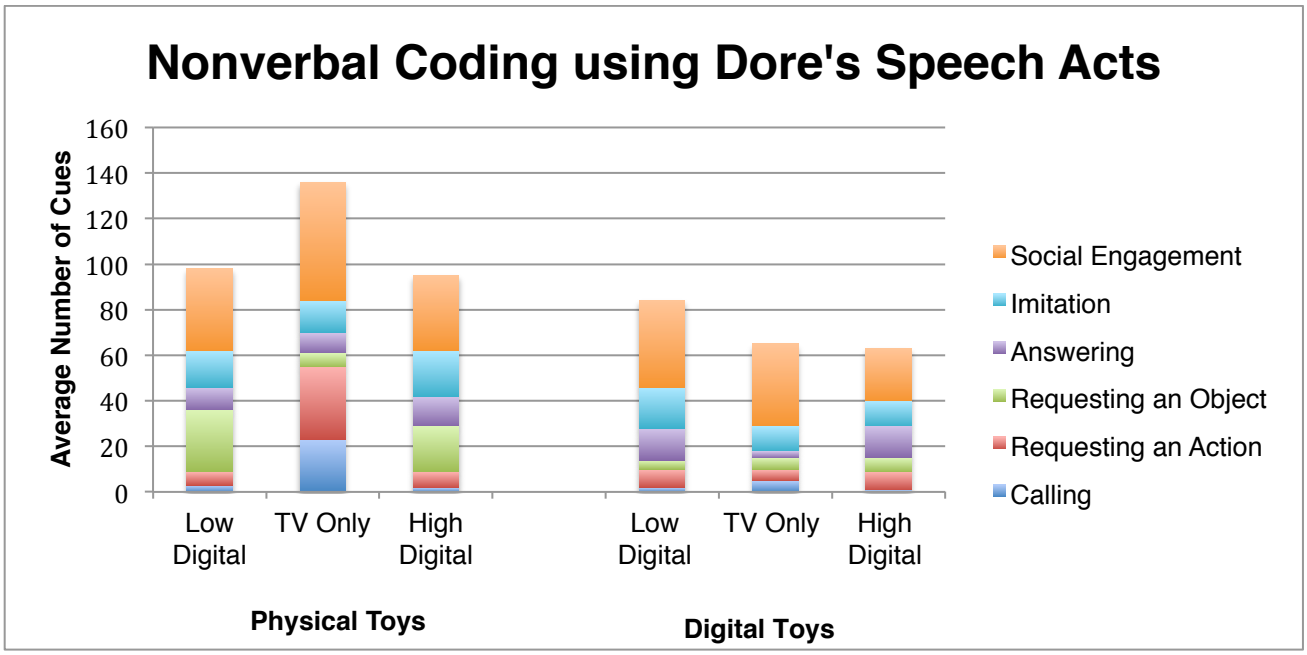


Additional Analysis with Speech Acts

A modified version of Dore's Primitive Speech Acts (Dore, 1975) was used for a more in-depth analysis of how the children used the nonverbal cues to convey social information (See Appendix B for Speech Act categories and descriptions). Social engagement was added to the original categories of greeting, calling, requesting an action, requesting an object, answering, labeling, protesting, and imitating. As coding progressed, the actions of calling, requesting an action, requesting an object, answering, imitation, and social engagement appeared most often during play, thus these categories were isolated for a further analysis.

Further comparison was conducted by combining all of the averages of the digital exposure groups across the three categories of eye gaze, body positioning and hand movement. For the low digital exposure group, the averages were very similar for both play conditions, except for requesting an object, which was markedly higher for the physical toy condition than the digital toy condition, 27 versus 4. For the TV exposure only group, the speech act averages were much higher during physical toy play, except in the area of imitation, which was similar for both play conditions. For the high digital exposure group, three speech act categories, requesting an object, imitation, and social engagement, had higher averages during physical toy play; the other three categories were similar for both play conditions. Table 5 below displays this information:

Table 5. Average number of cues in six speech act categories for three digital exposure levels during physical and digital toy play.



Discussion

The use of nonverbal communication, specifically eye gaze, body positioning, and hand movement, for the purpose of social engagement is instrumental to mature cognitive development of young children (Als, 1979; Bråten, 2008; Yu & Smith, 2013). The purpose of this study was to examine the nonverbal communication usage of young children from households with various amounts of digital exposure in order to explore how this was reflected in intersubjective play. During play with digital toys, the amount of eye gaze and changes in body positioning displayed by the children was significantly decreased compared to physical toy play, regardless of the extent of digital exposure in the home. The average use of hand movement engagement, however, was similar for physical and digital toy play conditions. Whether this can be attributed to a decrease in hand movements during physical play or an increase in hand movements during digital play on account of introduction of the tactile iPad, it is hard to say.

Recognition and understanding of facial expressions and the information they provide, such as intentions, emotions, reactions, etc. (Frith, 2009) is a skill that develops through experience, and play can be an extremely useful format to expand upon this experience (Trevarthen & Aitken, 2001). Potentially, digital toys can alter the normal progression and use of eye gaze to glean nonverbal information from the communication partner when they decrease the amount of eye contact maintained during play. In this study, social engagement was still initiated and maintained during digital play, even with a decrease in the amount of eye gaze. Rather than eye gaze, the use and following of hand movement by the children was used to stimulate social engagement during play. According to Yu and Smith (2013), although the child may not glean as much information by not attuning to facial expressions via eye contact, using their eye gaze to instead focus on and imitate the actions of the hands may allow them to stay present and attuned to nonverbal information in a different form during social play situations. Thus, the increase in hand movement in conjunction with the adult partner during digital toy play may further reinforce the social interactive approach to development put forth by Trevarthen and Aitken (2001), Brunner (1964), and Rogoff (1990).

The iPad is recognized as a tactile piece of digital technology, and it operates by physical touch. This could help to explain why there were almost equal instances of hand movement in the two play conditions. Since the low digital exposure children had little to no previous experience with the iPad's tangible digital technology, they might have been more susceptible to imitating the hand movements of the adult play partner. This could account for the higher averages of hand movement engagement in the digital toy condition compared to the physical toy condition.

The children in the TV exposure only category differed significantly in the categories of calling, requesting an action, and requesting an object during physical toy play and answering during digital toy play compared to the low and high digital exposure categories. The averages for calling and requesting were higher, and the categories of requesting and object and answering for lower for the TV exposure category. This divergence is unique, and a simple explanation is not obvious. The literature suggests that there is little definitive research to demonstrate that television has an adverse effect on young children (Anderson &Pempek, 2005). Therefore, it is only possible to speculate on what could be the reason for the observable differences in the TV exposure only category.

Limitations

Since this study did not look at the different forms of play and play behaviors exhibited by the children and adult play partner, it is difficult to theorize if the digital toys resulted in a decrease of pretend play, co-play, or initiated play actions for the children and the adult. A concern, first observed by Wooldridge and Shapka (2012) in their study involved 25 mother and infant pairs, is that digital toys may reduce the amount of verbalizations and variety of language, as well as altering the type of play behaviors exhibited between play partners. The current study built on data collected by Smith (2014) that focused on only the pragmatic aspects of interaction during play. Since both codings were not used, it is unclear if there are differences in the language contribution in the different forms of play.

Another limitation was the limited number of archived video available. An increase in the number of available videos would provide more data and increase the reliability of the coding and research findings. Also, there were instances during play where the high digital exposure

children wanted to interact with the iPad in the ways they were already familiar, but they were restricted during play and limited in the things they were allowed to do with the iPad.

Future Directions

In the future, it may prove to be advantageous to concentrate on the duration of nonverbal communication usage during play, as well as examine different play behaviors exhibited by the children to determine if digital toys have a direct impact on the type of play of children. Naturally, collecting more video data on more children would assist in strengthening the results of the research. A more consistent method for coding the speech acts for nonverbal cues could improve the reliability of the study.

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Appendix A

Developmental Questionnaire

1. How old is your child? _____Date of Birth_____ [ ] Male [ ] Female
2. Is your child meeting expected developmental milestones?
3. Are there other children in the family, if so, what are their ages? _____
4. List three of your child's favorite activities.
   1)
   2)
   3)
5. Does your child attend day care or a preschool program? [ ] yes [ ] no
6. If they attend one of these, is technology used there? [ ] yes [ ] no
7. Please fill out the following table on technology use in your home:

OBJECT(S)	WHERE IN THE HOME IS/ARE THE OBJECT(S) USED?	HOW OFTEN IS/ARE THE OBJECT(S) USED BY THE FAMILY? (HOURS/WEEK)	HOW OFTEN IS/ARE THE OBJECT(S) USED BY THE CHILD? (HOURS/WEEK)
SMART PHONE (IPHONE, DROID, ECT.)			
TABLET (IPAD, KINDLE, SAMSUNG GALAXY, ECT.)			
DESKTOP COMPUTER/ LAPTOP			
GAMING CONSUL (WII, XBOX, ECT.)			
HANDHELD GAMING DEVICES (GAMEBOY, PS2, ECT.)			
TELEVISION			
VIDEO CAMERA			
STILL CAMERA			

8. Is there any other information that you would like to give me about your child and his or her play and/or development? (Flip sheet over if necessary)

Appendix B

Primitive Speech Acts – Individually Defined with Examples

Greeting: making intentional note of someone's presence
Eye gaze: making eye contact and acknowledging the newcomer
Body positioning: turning body toward partner during initial contact or introduction
Hand movement: waving

Calling: intentionally trying to get someone's attention
Eye gaze: using eye contact to get someone's attention
Body positioning: leaning into partner with object in hand outstretched
Hand movement: holding object up toward partner to get their attention or gesturing for partner to join them in play

Requesting an Action: making a specific sign to someone that you want something done
Eye gaze: performing an action and making eye contact while waiting for an action/answer from adult
Body positioning: lifting the head or inclining the head and body toward partner to illicit a response
Hand movement: gesturing with hands to illustrate a requested task

Requesting an Object: making intentional actions for someone to give you an object
Eye gaze: making eye contact with adult and then shifting focus to desired object
Body positioning: leaning in to requested object with outstretched hand
Hand movement: holding out hand toward desired object

Labeling: identifying an object or person
Eye gaze: labeling an object by directing eye gaze to that object
Body positioning: directing attention to an object with a body part besides the hands
Hand movement: pointing at object or touching object when talking about the object

Answering: providing a noise or action in response to someone
Eye gaze: looking at adult to acknowledge that they spoke or are speaking
Body positioning: nodding, shaking head, or gesturing in response to a question
Hand movement: carrying out an action in response to partner's request, giving partner desired object, taking object offered by partner

Protesting: making a point that you are not happy about something
Eye gaze: looking down and away, often with added head and facial movement
Body positioning: shaking head firmly no or turning away from object
Hand movement: pushing object away, waving hands to signify "no"

Imitating: copying or trying to copy the actions of another person or object
Eye gaze: watching the partner's face to imitate their actions
Body positioning: copying partner's body movements

Hand movement: copying partner's hand movements

Social Engagement: interacting with someone during object play
Eye gaze: making eye contact in order to share in play behaviors and stay socially engaged with play partner
Body positioning: leaning or turning toward and shifting closer to partner
Hand movement: simultaneous hand movements when playing with the objects or gesturing when talking to interact with partner

Adapted from Albrecht, S. (2007)