Content Analysis of Language-Promoting Teaching Strategies: Do Strategies Match the Claims in Infant Directed Media?

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**ABSTRACT**

With producers of infant directed media constantly making educational claims and parents believing that this media will provide some type of educational benefit to their children, it is necessary to explore the content of this media. The present study explores whether or not the content of infant directed media matches the claims made by producers, with a focus on language development. A content analysis of 58 videos/DVDs for children aged 3 and younger, all of which contained some type of educational claim, was conducted. First, language and general knowledge claims made by producers of these videos were assessed. Next, the videos were examined at a scene-by-scene level for specific strategies used to present or ‘teach’ this material, in this case language-promoting strategies. Finally, each instance of content matching one or more of the claims made for a specific video was ‘tagged’ within the video at the time it occurred. Co-occurrence analyses were also conducted to examine at the scene level whether language-promoting strategies co-occurred in scenes tagged for language claims or for general knowledge claims.

The high level of onscreen print in these videos statistically co-occurring with language claims was surprising given infants’ developmental age. The high level of orienting to objects (i.e. using production techniques) was also surprising as well as the low amount of the point/give or follow gaze learning strategy. Instead of using strategies that have been shown to work with preschoolers or in live interactions, producers are using print on a screen and production techniques to teach material. It seems as though producers of these infant directed TV shows/DVDS have an idea of what they should be doing but somewhere along the line there has been a translational problem from theory to implementation.
INTRODUCTION

Despite the American Academy of Pediatrics’ (AAP) recommendation to avoid screen media exposure for children under the age of two (American Academy of Pediatrics, 1999), infants between ages 6 months and 3 years are exposed to an average of 1 to 2 hours of television per day (Pierrotsakos, Hanna, Self, Lewis, & Brewer, 2004; Rideout & Hamel, 2006; Rideout, Vandewater, & Wartella, 2003; Zimmerman, Christakis, & Meltzoff, 2007a, 2007b). It is currently estimated that 68% of children under 2 years of age watch television on an average day (Vandewater et al., 2005). Media products directed towards infants are gaining wide popularity with parents because of the teaching skills many of these videos claim to possess. Families with children under two own an average of 5-6 infant-directed videos (Pierrotsakos et al., 2004; Barr, Lally, Hilliard, Andolina, & Ruskis, in press). These videos frequently make claims for promoting learning in areas of cognitive, physical, language and social-emotional development.

Although this recommendation by the AAP has been in place for over ten years, parents still continue to use screen media as a learning tool. However, it appears that this knowledge gap is beginning to close. As reported in recent news, the Walt Disney Company is now offering refunds for their “Baby Einstein” videos. Lawyers threatened a class-action lawsuit for unfair and deceptive practices unless Disney agreed to refund the full purchase price to all who bought the videos since 2004 (Lewin, 2009). Their argument revolved around Disney’s explicit and implicit claims that their videos are educational and beneficial for early childhood development. The lawyers called these claims false because research shows that television viewing is
potentially harmful for very young children. Some take Disney’s refunds as a tacit admission that their videos did not teach what they claimed to.

In 1990, Congress enacted the Children’s Television Act. One of the major goals of the Act was to increase the quantity of educational and informational broadcast television programming for children (FCC). Even though the Act required each full-service television station that offers television programming in the U.S. to serve the educational needs of children, the Act failed to clearly define “educational.” Furthermore, the CTA left it up to broadcasters to determine the amount of programming they offered and the age groups they chose to serve. The gaps that exist in the CTA parallel the gaps that currently exist with infant-directed media.

Weber and Singer (2004) developed the Parent Media Survey to gather information about television and video viewing patterns of children under the age of 2. From their survey, it was discovered that babies as young as one-month-old watch television and videos—and their amount of viewing increases with age. They also discovered that four out of every five parents surveyed are “comfortable or very comfortable” with their infants watching television, and are satisfied with the educational videos their infants watch. Since infants are being exposed to various media at great lengths and parents believe this media provides educational benefits, it is imperative to understand how the content relates to the educational claims made by producers.

Content analysis

Infant-directed media products which posit themselves as educational have dramatically increased in number over the past decade, yet little research has specifically focused on infant-directed products for children 2 years and younger (Garrison & Christakis, 2005). A notable exception is a report produced by Garrison and Christakis (2005) that examined educational
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claims made by producers of infant directed media (DVDs/Videos, computer games, and video games). Their findings indicated that many of the claims made were related to larger domains, i.e. cognitive development, rather than about specific learning goals. The titles that did feature more specific claims were generally targeted at children over the age of two. A large majority of the products were found to encourage and promote parent-child interaction as a way of enhancing their educational value. This report was a first step in examining the assertions made by producers of a subsample of infant-directed media products and unfortunately, was not able to provide a detailed analysis. Clearly, additional empirical focus on this question is required.

One way to look at this more carefully is to look at early learning guidelines (ELGs) from early childhood development. Scott-Little, Kagan, Frelow and Reid (2008) conducted a content analysis of infant-toddler ELGs published by 21 states in the U.S. The goal of their study was to review the content of state infant-toddler early learning guidelines including how states organized their infant-toddler ELGs, the areas of children’s learning and development addressed and the relative emphasis states have placed on the various areas of children’s learning and development within their ELGs. It is important to note that 11 of the 21 states only used one or two age levels in their early learning guidelines. In other words, 8 states had guidelines that were written to cover the age span of 0 to 36 months while 3 states had guidelines that were split into two age groups, 0 to 18 months and 18 months to 36 months. This is interesting given the developmental differences between a newborn and a toddler.

This study examined the content of the early learning guidelines across five domains: physical development and motor skills, social and emotional development, approaches toward learning, language and communication, and cognitive development and general knowledge. Each domain was then broken down further into indicators with a total of 75 indicators across all
domains. Across all age levels (0-36 months), four of these domains—physical development and motor skills, social and emotional development, and cognitive development and general knowledge - were well represented within the infant-toddler ELGs, and coverage across these four domains was relatively balanced. When looking at the 0-18 months age group and the 19-36 months age group, we see that physical development and motor skills, and social and emotional development were higher within the younger age group while language and communication development, and cognitive development and general knowledge were higher with the older age group. These categories are beneficial to look at for infant development, especially language, which is why they will be applied to the infant directed media products in this study.

*Early language and communication development*

Language development is an important domain to examine in infant-directed videos because of infants’ critical developmental stage learning to communicate. Before infants can get to vocabulary acquisition, they need language development. Camaioni, for example has a three-stage model for early language development. The typical child progresses from communicating through conventional signals (gestural and vocal) to using words and sentences in order to express his or her meanings between 1 and 2 years of age (Camaioni, 2001). The ontogenesis of reference is a developmental course in which both child-object relations and child-other person relations evolve according to a three-stage model. During the first stage, attentional reference, an infant, around the middle of their first year of life, begins to focus attention on a target. They alternate their gaze back and forth between an object/event of interest and another person. They are also able to engage in relatively extended episodes of joint attention with a partner.
During the second stage, conventional reference, which occurs between 9 and 12 months, infants begin to use gestures, such as pointing, showing and offering, to actively direct adult attention to external entities. During this age period, infants also acquire a repertoire of word-like sounds to express their communicative intentions. During the last stage, that of symbolic reference, infants use representational gestures that represent a specific referent, i.e., their meaning, does not change with context. This ontogenesis of reference allows for progressive distancing between the child and the object-of-reference. Infants learn to communicate with others about objects in the world and this requires interactions with others.

In a book-reading context, Ninio (1983) observed the importance of maternal-fine tuning in the teaching of the first lexicon for children between 17 and 22 months. Because of the mother’s sensitivity to her child’s apparent level of knowledge, she can increase the level of correct labeling responses elicited by her child through asking questions (what questions and where questions) and labeling statements naming depicted objects, persons, and so on.

Mothers exhibit a high degree of sensitivity to signals of their child’s word knowledge and consequently, choose how they will go about teaching their child new words or furthering their child’s comprehension of certain words. Ninio found that vocabulary acquisition was highest for children of the label elicitors. This study highlights not only the importance of parent-child interaction in language acquisition, but also points out ways in which parents can foster in their child’s labeling responses during symbolic tasks such as book reading and television viewing.

In observed coviewing of Baby Mozart and Kids’ Favorite Songs 2 with 12-, 15-, and 18-month-old infants, Barr, Zack, Muentener, & Garcia (2008) argued that caregivers mediate their children’s processing of televised content and scaffold their television viewing. Thus, Barr et al.
predicted that the caregiver’s style (i.e., the level of scaffolding provided during coviewing) would influence the looking time and responsiveness of the child. In fact, higher proportions of video-relevant information, and in particular, questions and labels or descriptions provided by parents, were associated with higher percentage looking time and infant responsiveness. When this study was extended to include 6- and 9-month-olds (Fidler, Zack & Barr, 2010), the quality of interactions between parents and their infants was significantly associated with increased looking time. This relationship did not hold for the 6-month-olds though. This finding is consistent with Camaioni’s pattern of communication development.

Most of the current research on children’s media content has focused on preschool aged children instead of on infants. Research suggests that programs targeting preschool-aged children can be beneficial, provided they employ teaching strategies and content appropriate to children’s developmental levels. For example, notable immediate and long-term cognitive gains have been demonstrated following exposure to educationally oriented programs such as *Sesame Street* (Anderson, Huston, Schmitt, Linebarger, & Wright, 2001; Ball & Bogatz, 1970; Bogatz & Ball, 1971; Wright et al., 2001), *Blues Clues* (Anderson et al., 2000; Linebarger & Walker, 2005), and *Dora the Explorer* (Linebarger & Walker, 2005). Such gains have been shown to be further enhanced via positive interactive coviewing with parents (Cook et al., 1975), suggesting that perhaps a combination of quality educational content and interaction with caregivers provides an optimal environment for learning from screen media. Though benefits of preschool media have been examined, there is very little research regarding the content of infant directed media.

Rice (1983) found that some programs aimed for preschoolers package linguistic information in an attention-getting, yet content-redundant context. She also found that children
can learn word meanings and closely relate cognitive skills when viewing media. While this is very interesting for preschoolers, this needs to be further examined in the context of infant directed media.

Furthermore, in research with preschoolers, Rice and Woodsmall (1988) found that young children are able to learn something about novel object, action, and attribute words in a viewing situation. This supports the fact that preschoolers do indeed learn new words when watching television. However, current research does not indicate whether infants are able to learn new words or words, in general, from television.

*The present study*

While people are starting to look at infant directed media, the content and effectiveness of infant directed media is still unclear. To date, most of the research has been done with preschoolers and no other studies have really focused on infants. Thus, the present research aimed to explore the content of infant directed videos and to determine whether the claims made by producers match the content in the videos. For these videos, the types of learning strategies being used to present the material, the frequency these learning strategies occurred and the co-occurrences of various learning strategies were assessed. Because early language development is a key feature we would expect these videos to target, we focused our analyses on language teaching-promoting strategies such as questions, labeling, onscreen print, letter/phoneme identification and orienting to objects.

**METHODS**
An Internet search was conducted for screen media available for children under the age of three. Based on the results of this search, a comprehensive list of DVDs produced specifically for children aged 0-3 was compiled. The majority of videos produced for this age range are part of a series; therefore, we randomly selected two videos from each series for inclusion in our final sample. In the end, 58 videos were selected for language analysis.

**Claims Coding**

We examined both the structure of each video and the educational claims made by producers of each video. Educational claims were taken from the DVD packaging, inserts and special features. Educational claims were also taken from company websites. We coded the titles that accompanied these products, the presence of endorsements and whether these products cited relevant research, which would support the use of their product and the educational claims. Examples of educational claims are listed in Table 1.

Coders examined DVD packaging, inserts, special features and production company websites for educational claims made about each product. Each website was stored as a PDF file to preserve all of the claims found therein. The first step in coding a claim was to document the series, video, claim and location where it was found (e.g., DVD packaging, inserts, extras or company websites). All claims were transcribed verbatim into a spreadsheet and coded according to the type of claim being made.

An educational claim was defined as visual or verbal content suggesting that exposure to this media product “can assist children in learning important information, skills, values, and behavior while entertaining them and exciting their curiosity to learn about the world around them” (Children’s Television Act, 1990, p. 303a). For example, a company might claim that
their product introduces babies to colors, shapes and letters or teaches its viewers vocabulary. Each educational claim was coded for three separate categories: *behavioral claims and verb* (which related to the language of the claim); *kind of claim* (the domain each claim fell into); and *operational definition* (the operational definition that best fit the claim).

Each claim was coded for the educational domain that it encompassed. We adapted the domains identified by Scott-Little, Kagan, Frelow & Reid (2008) for the purposes of our analysis. The domains used within our content analysis were: *social/emotional* (e.g. self-esteem, prosocial behavior); *cognitive* (e.g., object permanence, problem solving); *language* (e.g. vocabulary development, sign language); *motor* (e.g. fine motor skills, soccer); *knowledge/information* (e.g. colors, animals). There was also a category for claims in which the domain was unclear.

The first category of education claim was termed *general*. These claims were so general that the learning goal was made unclear, was too broad or was rendered meaningless. A common general claim was that a product was going to promote cognitive development or inspire social development; for example, teaching a child object permanence. These claims were considered general because they related to a very large and broad domain – something that would be hard to pinpoint when trying to assess a particular lesson within a video. Claims that were designated as general were not coded any further; specifically, they were not coded for domain and were not given an operational definition.

Next, claims were either put into the category of implicit, explicit or explanatory. *Implicit* claims implied learning goals using non-specific language paired with a specific behavior (e.g. your child will be introduced to opposites and colors). Common verbs used in claims termed implicit were introduce, explore, encourage etc. *Explicit* claims were claims that
used behavioral specific verbs and strong wording such as “teaches” or “your child will learn” (e.g. teaches your child whole language and phonics using a combination of sight, sound, and interaction). *Explanatory statements* were lists of the content featured in the video made in the absence of verbs or any implied learning outcomes. For example, the back of the DVD may read that it includes music, letters, shapes and colors.

Each claim classified as implicit, explicit or explanatory statement was coded for the domain that it encompassed (e.g. social/emotional, cognitive, language, physical or general knowledge). An operational definition was assigned to each specific learning outcome, goal or behavior listed within each claim for implicit, explicit and explanatory statement claims (Scott-Little et. al, 2008). For example, where producers claimed that a video would introduce a child to language, an operational definition of “paying attention to language and language related sounds or alternate forms of communication, and understanding what someone says to you” could be assigned to that particular video. For coding purposes, each operational definition was assigned a number.

*Content Analysis*

After the claims were established, the 58 videos were coded for “pace” to break the content into meaningful units of analysis. Using this scheme, coders separated each video into scenes, and further parsed each scene according to character and object changes. A scene is defined as one physical location where some action takes place, and a character change is defined as anytime a character enters or exits a scene.

Coders then went back and tagged the scenes for the different claims made by the producers. Coders examined each video’s content and noted every scene where the content
matched a claim by the videos’ producers. For example, if one of the claims made by a particular video was that it teaches numbers, any scenes containing numbers would be ‘tagged’ as having content matching its educational claims.

**Learning Strategies Coding**

All scenes were assessed for specific strategies used to present or ‘teach’ this material, including those targeting memory, general knowledge, executive functioning, language development, and observational learning. For the purposes of this study, we were concerned with language learning strategies and, scaffolding and joint attention learning strategies since producers most often claimed to teach language and general knowledge. Language promoting strategies include: age-appropriate questions between characters, letter/phoneme identification, different types of onscreen print font and labeling. Scaffolding and joint attention strategies include: point/give or follow gaze and orienting to objects. These learning strategies were selected based on previous research with preschoolers and research performed in the context of live interactions. Descriptions of each learning strategy are presented in Table 2.

After the learning strategies were evaluated for each video, we looked to see where the learning strategies of the videos matched up to the claims made by the producers. In doing so, we were able to see where the content represents a claim and how and where it was being presented. A data set was created in which all of the videos were broken down into scenes with their learning strategies, general content and whether or not they were tagged for specific claims.

**Co-occurrence analyses**
Videos were then analyzed at the scene level to examine whether language-promoting strategies co-occurred in scenes tagged for language claims or for general knowledge claims. Videos were coded scene by scene in individual excel spreadsheets, with a separate spreadsheet for each variable grouping (for example, different learning strategies). These spreadsheets were merged into a single spreadsheet for each variable grouping. In the open source statistical program R, these sheets were joined using the combination of Video Name and Scene Number as a primary key. For every combination of two variables of interest, a 2x2 contingency table was generated where the columns and rows were either the variable occurring or not occurring. From this table, we calculated the probability of co-occurrence \((a/n)\), the probability of each variable occurring independently of the other variable\([(a+b)/n, (a+c)/n]\) for the row variable, \([(a+b)/n, (a+c)/n]\) for the column variable), the conditional probability of one variable occurring given that the other occurred \([a/(a+b), a/(a+c)]\) for the conditional probability of the column variable occurring given that the row variable has occurred, and \([a/(a+b), a/(a+c)]\) for the conditional probability of the row variable occurring given that the column variable has occurred), the expected probability of co-occurrence \([ ((a+b)(a+c))/n^2 ]\), and conducted hypothesis tests to determine whether or not there was a statistically significant relationship between the two variables.

The appropriate test for independence between two nominal categorical variables in a contingency table is either Pearson's chi-square test when the sample size is sufficiently large and the chi-square approximation can be used or Fisher's exact test, when dealing with small cell counts. Fisher's exact test is more conservative, so Pearson's chi-square is preferred when the large-sample approximation is valid. The commonly used Cochran’s rule of thumb for using the chi-square test for a 2x2 contingency table requires that all four cells have expected counts of at
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least 5. We applied this rule to determine the appropriate hypothesis test for each case where a test of independence was evaluated. All hypothesis tests were conducted using the relevant test.

Since we were conducting numerous hypothesis tests, it was necessary to adjust our p-values because of the multiple comparisons problem. The multiple comparisons problem arises when multiple tests are conducted, which causes the number of mistakenly rejected null hypotheses to be higher than the specified significance level. The False Discovery Rate method was used to correct for this, which is less conservative than the family-wise Error Rate method, and controls the expected proportion of type I errors.

RESULTS

Coding and Reliability

For claims coding, inter-rater reliability calculated for 15 of the 58 videos surveyed (25% of the sample) was high. The overall kappa for claims coding was .88 and for tagging of content in the videos that matched claims the overall kappa was .78. For learning strategies, reliability was likewise high. 20% of the videos were double coded for each of the two language passes. The Cohen’s K values ranged from 0.68 to 1.00, and the average of the Cohen’s K was 0.79. 25% of the videos were double coded for the joint attention and scaffolding learning strategy and the average of the Cohen’s K was 0.83.

Descriptive Statistics

Table 3 displays the content area distributions for claims made and the corresponding tagged video content. Looking at this table, it is clear that general knowledge claims and language/literacy claims make up the most amount of claims found on packaging, website, and
promotional materials, i.e., that producers claim to teach these the most. Thus, the rest of my paper will be focused on these claims and the language-promoting strategies employed to support producer’s claims that they were teaching general knowledge and language content.

Table 4 conveys the learning promoting strategies distributions across the videos and scenes in these infant directed media products. From Table 5, the first thing to point out is the tremendously high level of print. After print, occurring most often across all scenes in all videos is descriptive elaborative matched labeling. In contrast, the point/give or follow gaze learning strategy is tremendously low. It is also interesting to note that orienting to objects is in 50 videos but it is only in 15.18% of the scenes. The same thing occurs with questions; it is in about half of the videos but only a very small percentage of the scenes contain questions.

**Co-Occurrences**

The next step is to look at the videos at the scene level to observe exactly where scene content matches a claim, and to identify which strategies are being used within a scene to teach language and general knowledge content. Table 5 presents the scene level co-occurrences between tagged claims and learning strategies. Overall, thirteen of the language promoting strategies significantly co-occurred with language claims, while five of the language promoting strategies significantly co-occurred with general knowledge claims. In other words, they occurred more frequently than would be predicted by chance.

Simple matched labeling significantly co-occurred with language claims while descriptive elaborative matched labeling significantly co-occurred with general knowledge claims. Surprisingly, descriptive elaborative mismatched labeling significantly co-occurred with
language claims, though this co-occurrence only occurred in 2.36% of all scenes in all videos tagged for language claims.

There is a high amount of onscreen print in the infant-directed media products we examined. Onscreen print with matched referent both significantly co-occurred with language claims and with general knowledge claims. Onscreen print without a referent also significantly co-occurred with language claims and general knowledge claims, though in this case, the percentage of scenes containing the co-occurrence is much less than that of the onscreen print with matched referent.

Orienting to objects significantly co-occurred with language claims and general knowledge claims, occurring more frequently than would be expected by chance. This learning strategy was used surprisingly frequently to promote language. For example, every time there was a scene tagged for language claims, orienting to objects co-occurred with it 98.7% of the time. *Who questions* significantly co-occurred with general knowledge claims, though this co-occurrence only occurred in 2.92% of all scenes in all videos tagged for general knowledge claims.

**DISCUSSION**

The present study was undertaken in order to explore the content of infant directed videos and to determine whether the claims made by producers match the content of the videos. It focused on language promoting strategies; since language development is a key area we would expect these videos to focus on. It also represents one of the first studies to explore infant directed media at a scene level, matching content to claims. There are numerous noteworthy
findings from this study. The high level of onscreen print, the high level of orienting to objects, and the low level of point/give or follow gaze are all surprising results.

Many of these infant directed videos employ onscreen print as a means to promote language. In fact, onscreen print significantly co-occurred with both language claims and general knowledge claims in these videos. By age two or three, children begin to develop an awareness of printed letters and words (Department of Education, 2002). They see adults around them reading, writing, and using printed words for many purposes in their everyday lives. For infants, though, the use of onscreen print seems inappropriate given infants’ developmental age. Since infants cannot read, it might be more distracting than it is useful.

Some may argue that the high level of onscreen print serves the purpose of fostering interaction between parents and child, i.e., that parents are present for the video viewing. However, in a telephone survey of 1,009 parents of children aged 2 to 24 months, Zimmerman, Christakis, & Meltzoff (2007) found that only 32% of parents report watching television or videos with their child every time the child watches. While this could mean that 2/3 of parents watch television with their child half the time their child watches, it still shows that parents are not always present to explain what the onscreen print words mean. Furthermore, research on the effects of television exposure on infant and caregiver behavior has shown that the amount of caregiver–infant interaction is reduced when the television is on (Kirkorian, Pempek, Schmidt, & Anderson, 2008; Mendelsohn et al., 2008; Pempek, Demers, Anderson, & Kirkorian, 2007). Therefore, the idea of onscreen print seems inappropriate given that parents are not always present to interact with their child.

As previously discussed, Barr, Zack, Muentener, & Garcia (2008) examined the relation between early television exposure and parental interaction style during infant-directed television
programs on two outcomes: infant looking time and infant responsiveness. This study pointed
out that there are large individual differences in how parents interact with their infants during the
 television-coviewing situation. High-scaffold parents almost exclusively discussed the content
of the video with their infants, whereas low-scaffold parents spent little time orienting infants to
the video at all. This is important in the context of the high level of onscreen print in these
videos. Since parents have such a wide variety of interacting styles, the use of onscreen print
again seems inappropriate given that not all parents do an adequate job of interacting with their
child.

Orienting to objects is one of the learning strategies that occurred most commonly in all
of these videos. It includes production techniques such as sound effects or camera zooms. In a
study examining the formal features of infant DVDs, Goodrich, Pempek, & Calvert (2009) found
that these videos rely heavily on the use of perceptually salient production features (camera cuts,
sound effects and visual special effects, for example) that may get infants to look at the screen
but are probably very difficult for them to understand. Given the difficulty infants have in
understanding perceptually salient production features, it is surprising how often orienting to
objects occurs is used as a learning strategy in these videos. In addition, this high level is
surprising compared to the low level of various other strategies, all of which have been found to
be effective in research with preschoolers and in live interactions such as book reading. Instead
of using more complex strategies to teach language to infants (i.e., labeling and questions),
producers are choosing to use onscreen print and production techniques.

Given infants’ development age, the low level of point/give or follow gaze seen in these
videos is surprising. In fact, it barely occurred in any of these videos (any of the ones studied
here). As earlier discussed, Camaioni (2001) came up with a three-stage model for early
-language development. During the first stage, attentional reference, an infant begins to focus attention on a target around six months of age. They alternate their gaze back and forth between an object/event of interest and another person. They are able to coordinate attention toward an object/event and another person in one and the same episode and to engage in relatively extended episodes of joint attention with a partner. At this level of development infants also begin to follow another person’s direction of gaze to outside entities. The second stage is conventional reference, which occurs between 9 and 12 months, infants begin to use gestures, such as pointing, showing and offering, to actively direct adult attention to external entities. Given this information, we expected there to be a high level of pointing and gazing in these videos since these actions are is a key feature of infants’ language development. Thus, we were surprised when producers did not utilize this technique.

Given the ubiquity of infant-directed media in today’s society, this study was important in examining how the content of these videos matches up to the claims made by producers. The average 6-month-old has at least four baby videos, and the average 18-month-old owns over seven (Barr, Lally, Hilliard, Andolina & Ruskis, in press). Parents, themselves, emphasize the educational benefits of these videos as the foremost reason for having their children watch them (Zimmerman, Christakis, & Meltzoff, 2007). With the amount of media in the home, and parents’ expectations for their child to learn something, a detailed content analysis of infant videos was a necessary step in the right direction.

An important future step of study is to assess whether or not infant directed media influences infant outcomes directly. To date, there is little research regarding how media affects the live of infants, i.e., whether it has a positive, negative, or neutral effect on users. Christakis & Garrison (2005) point out how we need to vastly increase research on the impact of
educational media products on very young children, specifically using comparison groups to determine if media teaches children more or less effectively than other alternatives. In fact, this lab is undergoing research now that examines this question. A study is being conducted in which we are intervening in infants’ homes with videos that have been found to contain “good educational content”. We want to examine if there are differences in households that do not receive this “good media”, households that do receive this “good media,” and households that receive this “good media” along with instructions on how caregivers can effectively interact with their child. While the present study examined the actual content of these videos, it is now pivotal to determine if these videos can directly affect infants.

Another important future direction is to examine the co-occurrences of these learning strategies in the videos. For example, orienting to objects occurs at an extremely high rate. But what are producers orienting infants to? It would be interesting to explore the types of learning strategies co-occurring with orienting to objects, i.e. if onscreen print or labeling is occurring with this strategy. Future directions of this project will also involve investigating how songs are used in videos, as well as the use of foreign language and sign language.

There are several limitations to this study. First and foremost, a small sample size was obtained. If more videos had been selected for analysis, the results might have been different. Secondly, these videos were selected based on the best selling baby videos in 2007. In the course of three years, new infant directed media could have been developed. Thirdly, this sample was obtained in the United States. If we had obtained the sample internationally, results might have been different. In addition, the results of the present study could have been generalized more easily to the greater world population if videos were taken from an
international sample. Lastly, we only examined infant directed videos. We did not look at other types of educational products such as computer games or video games.

The infant media industry is a multi-million dollar industry with sales of Baby Einstein videos alone being estimated at $200 million in 2005 (Christakis & Garrison, 2005). With a substantial number of children using media in excess of the amounts recommended by the American Academy of Pediatrics (they recommend no screen media exposure for children under two) (Rideout & Hamel, 2006), it is imperative to examine the content of these infant directed videos. Furthermore, with producers claiming educational benefits and parents expecting these videos to accomplish what they assert, it was necessary to examine how the content of the videos matches the claims made by producers, which is what was achieved in this study. It seems as though producers of these infant directed TV shows/DVDS have an idea of what they should be doing but somewhere along the line there has been translational problem from theory to implementation.
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Table 1

**Examples of Educational Claims**

“Teaches your child whole language and phonics using a combination of sight, sound, and interaction.”

“Inspires early language development – from simple gestures to first spoken words!”

“Stimulates young minds and helps babies fulfill their natural desire to communicate.”

“Cultivates emerging literacy, language fluency and numeracy by introducing youngsters to the alphabet, numbers, directions, colors, sequences and new vocabulary.”
### Language promoting strategies and descriptions

<table>
<thead>
<tr>
<th>Language Promoting Strategy</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Letter/phoneme identification</td>
<td>Verbal/visual identification of letters or the basic sounds in words</td>
</tr>
<tr>
<td>Simple matched label</td>
<td>The name/title of an object is stated and matched with a visual depiction</td>
</tr>
<tr>
<td>Descriptive elaborative matched label</td>
<td>Label (in a sentence with descriptive elaboration) matches a visual depiction</td>
</tr>
<tr>
<td>Simple mismatched label</td>
<td>The name/title of an object is stated and mismatched with a visual depiction</td>
</tr>
<tr>
<td>Descriptive elaborative mismatched label</td>
<td>Label (in a sentence with descriptive elaboration) does not match a visual</td>
</tr>
<tr>
<td>Onscreen print with matched referent</td>
<td>Print accompanied by a matched visual picture or verbal statement</td>
</tr>
<tr>
<td>Onscreen print with mismatched referent</td>
<td>Print and label are mismatched or occur at different times</td>
</tr>
<tr>
<td>Onscreen print without referent</td>
<td>Print is not accompanied by either a verbal statement or a visual depiction</td>
</tr>
<tr>
<td>Who question</td>
<td>Open-ended questions between characters</td>
</tr>
<tr>
<td>Yes/no question</td>
<td>Questions that elicit a yes/no response</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>----------------------</td>
<td>----------------------------------------------------------------</td>
</tr>
<tr>
<td><strong>Verbal vocabulary</strong></td>
<td>A word is presented in some way to teach its meaning</td>
</tr>
<tr>
<td><strong>definition</strong></td>
<td>Use of attention-directing words/phrases or visual production</td>
</tr>
<tr>
<td></td>
<td>techniques to elicit attention</td>
</tr>
<tr>
<td><strong>Orienting to</strong></td>
<td>Character points to or looks towards something or someone to</td>
</tr>
<tr>
<td><strong>Objects</strong></td>
<td>signal another character</td>
</tr>
<tr>
<td><strong>Point/give or</strong></td>
<td></td>
</tr>
<tr>
<td><strong>follow gaze</strong></td>
<td></td>
</tr>
</tbody>
</table>
## Table 3

*Content area distributions for claims made and corresponding tagged video content*

<table>
<thead>
<tr>
<th>Type of claim</th>
<th>Total number of claims found on packaging, website, and promotional materials</th>
<th>Percentage of all coded claims</th>
<th>Total number of times content tagged for claim across all videos</th>
<th>Average number of tags per claim</th>
<th>Percentage of all tagged content</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Knowledge</td>
<td>150</td>
<td>30.80%</td>
<td>2964</td>
<td>19.76</td>
<td>47.30%</td>
</tr>
<tr>
<td>Language/Literacy</td>
<td>140</td>
<td>28.75%</td>
<td>2292</td>
<td>16.37</td>
<td>36.57%</td>
</tr>
<tr>
<td>Social Emotional</td>
<td>72</td>
<td>14.78%</td>
<td>291</td>
<td>4.04</td>
<td>4.64%</td>
</tr>
<tr>
<td>Physical Development</td>
<td>64</td>
<td>13.14%</td>
<td>585</td>
<td>9.14</td>
<td>9.33%</td>
</tr>
<tr>
<td>Cognitive Development</td>
<td>61</td>
<td>12.53%</td>
<td>135</td>
<td>2.21</td>
<td>2.15%</td>
</tr>
</tbody>
</table>
### Learning strategies distributions across videos and scenes

<table>
<thead>
<tr>
<th>Learning Strategies</th>
<th>Proportion of Videos Using Strategy (out of 58 videos)</th>
<th>Proportion of scenes strategy is used in (out of the 6,349 scenes in all videos)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Simple Matched Label</td>
<td>23.2% (13 videos)</td>
<td>5.99</td>
</tr>
<tr>
<td>Simple Mismatched Label</td>
<td>14.3% (8 videos)</td>
<td>0.27%</td>
</tr>
<tr>
<td>Descriptive Elaborative Matched Label</td>
<td>92.9% (52 videos)</td>
<td>21.3%</td>
</tr>
<tr>
<td>Descriptive Elaborative mismatched Label</td>
<td>41.1% (23 videos)</td>
<td>1.17%</td>
</tr>
<tr>
<td>Onscreen Print Referents (Any Modifier)</td>
<td>91.07% (51 videos)</td>
<td>22.52%</td>
</tr>
<tr>
<td>No visual/verbal Referent</td>
<td>53.57% (30 videos)</td>
<td>2.52%</td>
</tr>
<tr>
<td>Matched visual/verbal referent</td>
<td>82.14% (46 videos)</td>
<td>19.78%</td>
</tr>
<tr>
<td>Questions (Any Modifier)</td>
<td>53.57% (30 videos)</td>
<td>3.29%</td>
</tr>
<tr>
<td>Who</td>
<td>44.46% (24 videos)</td>
<td>1.67%</td>
</tr>
<tr>
<td>Yes/No</td>
<td>46.43% (26 videos)</td>
<td>1.67%</td>
</tr>
<tr>
<td>Letter/Phoneme Identification</td>
<td>16.1% (9 videos)</td>
<td>1.26%</td>
</tr>
<tr>
<td>Verbal Vocabulary Definition</td>
<td>37.5% (21 videos)</td>
<td>0.36%</td>
</tr>
<tr>
<td>Orienting to Objects</td>
<td>86.21% (50 videos)</td>
<td>15.18%</td>
</tr>
<tr>
<td>Point/Give or Follow Gaze</td>
<td>10.71% (6 videos)</td>
<td>0.11%</td>
</tr>
</tbody>
</table>
Table 5

Scene level co-occurrences between tagged claims and learning strategies

<table>
<thead>
<tr>
<th>Learning Strategies</th>
<th>Any Language Claim</th>
<th>Any General Knowledge</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Actual #</td>
<td>Actual #</td>
</tr>
<tr>
<td></td>
<td>within-scene co-occurrences (expected #)</td>
<td>within-scene co-occurrences (expected #)</td>
</tr>
<tr>
<td></td>
<td>% scenes containing co-occurrence</td>
<td>% scenes containing co-occurrence</td>
</tr>
<tr>
<td>Letter Phoneme Identification</td>
<td>47 (21) +</td>
<td>2.58%</td>
</tr>
<tr>
<td>Simple Matched Label</td>
<td>166 (95) +</td>
<td>9.13%</td>
</tr>
<tr>
<td>Descriptive Elaborative Matched Label</td>
<td>354 (352)</td>
<td>19.5%</td>
</tr>
<tr>
<td>Simple Mismatched Label</td>
<td>4 (5)</td>
<td>0.22%</td>
</tr>
<tr>
<td>Descriptive Elaborative Mismatched Label</td>
<td>43 (20) +</td>
<td>2.36%</td>
</tr>
<tr>
<td>Onscreen Print with Matched Referent</td>
<td>602 (316) +</td>
<td>33.1%</td>
</tr>
<tr>
<td>Onscreen Print with Mismatched Referent</td>
<td>0 (1)</td>
<td>0.00%</td>
</tr>
<tr>
<td>Onscreen Print without Referent</td>
<td>72 (43) +</td>
<td>3.96%</td>
</tr>
<tr>
<td>Who Question</td>
<td>38 (37)</td>
<td>2.09%</td>
</tr>
<tr>
<td>Category</td>
<td>Yes/No Question</td>
<td>Verbal Vocabulary Definition</td>
</tr>
<tr>
<td>--------------------------------------------</td>
<td>-----------------</td>
<td>------------------------------</td>
</tr>
<tr>
<td>Yes/No Question</td>
<td>25 (35)</td>
<td>18 (38) ^</td>
</tr>
<tr>
<td>Verbal Vocabulary Definition</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Orientation to Objects</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Point/Give or Follow Gaze</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

^ co-occurrence significantly greater than predicted by chance

^ co-occurrence significantly less than predicted by chance