Critical Review:

What is the impact of low socioeconomic status on the vocabulary development of typically developing children prior to school entry?

Kelly Gain
M.Cl.Sc (SLP) Candidate
University of Western Ontario: School of Communication Sciences and Disorders

This critical review examines the impact of low socioeconomic status (SES) on the vocabulary development of typically developing children prior to beginning school. The critically appraised studies vary in their measures of SES and vocabulary outcomes. Study designs include: cohort studies and longitudinal cohort studies. Overall, the results provide suggestive Level III evidence that in the first 3-years of life, children from families of low-SES have significantly smaller vocabularies than their peers from higher socioeconomic backgrounds, and that this association with SES may be evident as early as 18-months of age. Possible factors contributing to the effect of SES on early vocabulary development are discussed. The findings of this review have clinical implications relevant to practicing Speech-Language Pathologists.

Introduction

Socioeconomic status (SES) is typically measured in terms of familial income, occupation and education. It is commonly understood as the social standing or social class of an individual (Hoff, 2006). There has long been concern that children from families of low-SES underachieve academically in comparison to their peers from families of higher-SES (Ginsborg, 2006). Prior to the 1960's disparities in both cognitive and linguistic skills associated with SES were often attributed to genetics. Reissman (1962) was among the early researchers to argue that SES disparities in school success resulted from differences in the early home experiences of disadvantaged children, rather than from irreversible genetic differences. This view offered hope for solutions through early intervention and set the stage for a wide variety of research studies investigating the effect of SES and social disadvantage on the cognitive and linguistic development of children.

The current literature suggests that by the time children enter kindergarten, those from low socioeconomic backgrounds differ substantially from their more advantaged peers in cognitive and verbal skills (Ramey & Ramey, 2004). A well recognized component of verbal skills is vocabulary knowledge, which is defined as the set of words within a language that are familiar to a person. An extensive body of research states that vocabulary knowledge is fundamental to reading comprehension and subsequent literacy success (Christ & Wang, 2010; Dickinson & Neuman, 2007; Lonigan, Burgess & Anthony, 2000).

The research has revealed that significant differences in verbal abilities are evident when children enter school, suggesting that such disparities must begin emerging in the first few years of a child's life. During the pre-reading period from birth to age 6, almost all learning occurs orally. Thus, the child's oral vocabulary knowledge and language at this stage set children on particular trajectories that have serious implications for academic success (Farkas & Beron, 2004). It is, therefore, crucial for Speech-Language Pathologists (SLP's) to understand the association between SES and early vocabulary development in order to best support the language development of disadvantaged children when they enter school.

Objectives

The primary objective of this paper is to critically evaluate existing literature on the impact of low- SES on the vocabulary development of typically developing children prior to school entry. The secondary objective of this paper is to suggest evidence-based clinical implications for SLP's.

Methods

Search Strategy

The computerized data bases PsychINFO, CINAHL, ProQuest Education, PubMed and Scholars Portal were searched using the following criteria: [((low socioeconomic status) OR (at-risk) OR (low income) OR (vulnerable) OR (disadvantaged) OR (class)) AND (vocabulary) AND ((child*) OR (infant*) OR (preschool*))]. The search was specific to articles written in English.

Additional related studies were obtained from the reference lists of previously searched articles.

Selection Criteria

Studies selected for inclusion in this critical review were required to investigate the effect of low-SES on

the vocabulary development of children prior to school entry. No limits were set on the study design, outcome measures, or date of publication. Studies that investigated the effect of low-SES on vocabulary development in premature infants were excluded from this review.

Data Collection

Results of this literature search yielded 5 articles congruent with the aforementioned selection criteria. These included the following study designs: cohort study [2], prospective longitudinal cohort study [2] and retrospective longitudinal cohort study [1]. The study designs of the Critically Appraised Papers (CAPs) were rated against the NHMRC Levels of Evidence (2009).

Results

Study #1: Hart & Risley (1995) conducted a prospective longitudinal cohort study that examined the association between early experience and language development from the time a child was 10-months to 3-years of age (n=42) in families of varying SES. Families were grouped into three socioeconomic categories based on parent occupation: higher-SES (professional families; n= 13), middle-lower SES (working class families; n=23) and families who were on welfare (n=6). Researchers observed and recorded 1-hour each month of every word spoken at home by the children and caregivers over 2.5 years with consistency in the recorder maintained for individual families. Appropriate and acceptable inter-rater reliability was reported. Outcome measures included vocabulary growth (the trajectory of expressive vocabulary change at age 3 derived from a multi-level non-linear analysis of each child's cumulative vocabulary growth) and vocabulary use (the number of different words used by the child per hour averaged over 4 observations at 33- to 36- months of age). An appropriate ANOVA revealed significant differences in both vocabulary growth and vocabulary use at 3-years of age in children of varying SES. Descriptively, the observed cumulative vocabulary for children in high-SES families was drastically larger (1110 words) than children from middle-lower-SES families (750 words) and children from families on welfare (525 words). A widening gap between children of varying SES was evident as early as 24-months of age.

Hart and Risley analyzed their data for statistically significant differences in the early experiences of children from varying socioeconomic backgrounds. Their analysis revealed that the most important aspect of a child's language experience was quantity. Thus, the more parents talked with their child from birth to age 3, the better their child's vocabulary outcome.

Major strengths of this study include the large sample size and longitudinal prospective design. The use of the number of words each child was observed to use as the measure of vocabulary size was one possible limitation of the study, as recordings only captured 1-hour each month. A second limitation is a possible observer-effect. Procedures were put in place to reduce the effect of having an observer in the home such as observing families prior to initiation of data collection and making it clear, through both the researchers words and actions, that they were only observing the child. Additionally, claims about the impact of poverty and low-SES on language development are overstated by Hart and Risley, given that only 6 families on welfare participated.

This study provides Level III evidence that is suggestive of a negative effect of low-SES on vocabulary development in children prior to school entry, with a socioeconomic disadvantage present as early as 24-months of age.

Study #2: Fenson, Cronan & Pethick (1998) used a cohort design to compare the language skills of a group of very low-income 16- to 30- month old children (n=103) with those of three middle-class samples matched on age and sex drawn from the MacArthur Communicative Development Inventory (CDI) normative data set. The
MacArthur CDI parent report form, a well accepted tool for this purpose, was utilized to assess vocabulary. An appropriate ANOVA revealed significant differences between the low-income toddlers and the middle-class sample on vocabulary production, combining words, and sentence complexity. The reported effect sizes were among the largest in the literature for children under 3-years of age.

Strengths of this study include the use of three separate samples from the CDI data set. A potential limitation, which was acknowledged by the researchers, is the fact that the norms of the MacArthur CDI are based on a middle-class sample and may not be applicable to children from low socioeconomic backgrounds. A further limitation associated with the use of parent report, is that a child's score is based on the parent's ability to judge their language skills. Fenson et al., suggested the possibility that parents of higher-SES may over-estimate their children's verbal abilities to comply with social desirability, or that parents of lower-SES may underestimate their children's language skills.

This study provides Level III evidence that is suggestive of a negative impact of low-SES on

productive vocabulary in children under 3-years of age.

Study #3: Fernald, Marchman & Weisleder (2013) conducted a prospective longitudinal cohort study that examined the development of language processing efficiency and vocabulary learning at 18- and 24-months of age in children (n=48) from families of varying SES. Vocabulary was measured using the MacArthur CDI. Familial SES was determined by the Hollingshead four-factor Index of Social Status (Hollingshead, 1975) based on a weighted average of both parents' education and occupation. An appropriate ANOVA revealed a significant main effect of SES on vocabulary development at both 18- and 24-months of age. Further analysis revealed that the pattern of developmental change in vocabulary differed as a function of SES. Significant between group differences in the vocabulary scores of children from varying socioeconomic backgrounds were evident at 18-months, and even larger at 24-months of age.

One possible limitation to this study was previously discussed. As with Fenson et al. (1998), this study used parent report as a sole vocabulary measure with a sample of children from families of low-SES.

This study provides Level III evidence that is suggestive of a negative effect of low-SES on vocabulary development in children that is evident as early as 18-months of age.

Study #4: Rescorla and Achenbach (2002) conducted a cohort study that investigated the effects of age, gender, SES and ethnicity on the Language Development Survey (LDS; Rescorla, 1989) vocabulary checklist score and mean length of utterance in children from 18- to 35-months of age (n=278). Participants were recruited as part of the 1999 National Survey. SES was coded using Hollingshead's four factor Index and families were divided into low-SES (n=50) middle-SES (n=125) and upper-SES (n=86) categories. An appropriate ANCOVA revealed significant main effects of age, gender and SES group (low, middle, upper) on mean vocabulary scores. Correlation analysis revealed a small but significant correlation between vocabulary score and the 9-point SES- score.

Strengths of this study include the use of a reportedly reliable and valid screening tool for language delay in children under 3-years of age. Test re-test reliability and internal consistency of this test as well as high sensitivity and specificity were reported, although these measures have not been replicated by an independent research group.

This study provides Level III evidence that is suggestive of a significant effect of low-SES on vocabulary development at 18- to 35- months of age.

Study #5: Farkas and Beron (2004) conducted a retrospective longitudinal cohort study which investigated the effect of race and social class on vocabulary development in children from 36- to 156-months of age (n=5107) gathered from the Children of the NLSY79 (CNLSY) data sets. Vocabulary was measured using the Peabody Picture Vocabulary Test (PPVT-III; Dunn & Dunn, 1997), a widely accepted measure for this purpose. SES was determined based on the child's maternal grandmother's education level, the child's mother's education level, and the number of years familial income fell below the poverty line. Vocabulary scores were plotted by the child's age in months and multilevel growth curve modeling produced trajectories of vocabulary from 36-months to 13-years of age based on means for
specified groups. Appropriate ANOVA revealed a significant positive effect of SES on vocabulary scores a 36-months of age. SES interactions with age were not statistically significant, indicating that the principal effect of SES on vocabulary occurs prior to 36-months of age.
Study #5: Farkas and Beron (2004) conducted a retrospective longitudinal cohort study which investigated the effect of race and social class on vocabulary development in children from 36- to 156- months of age (n=5107) gathered from the Children of the NLSY79 (CNLSY) data sets. Vocabulary was measured using the Peabody Picture Vocabulary Test (PPVT-III; Dunn & Dunn, 1997), a widely accepted measure for this purpose. SES was determined based on the child's maternal grandmother's education level, the child's mother's education level, and the number of years familial income fell below the poverty line. Vocabulary scores were plotted by the child's age in months and multilevel growth curve modeling produced trajectories of vocabulary from 36-months to 13-years of age based on means for specified groups. Appropriate ANOVA revealed a significant positive effect of SES on vocabulary scores at 36-months of age. SES interactions with age were not statistically significant, indicating that the principal effect of SES on vocabulary occurs prior to 36-months of age.

Further analysis revealed that over half of the effect of SES on vocabulary development was attributed to high verbal scores of mothers from higher social classes and to high scores on a commonly employed home environment questionnaire combining measures of cognitive stimulation, maternal warmth toward the child, and the provision of a safe and clean

environment.

This novel retrospective analysis of a national data set strategically computed growth curves for vocabulary scores to provide a more detailed account of vocabulary growth than had been previously available in the literature. A possible limitation of this study was the lack of any expressive vocabulary measures.

This study provides Level III evidence that is suggestive of a negative impact of low-SES on receptive vocabulary in children at 36-months of age. It provides compelling evidence that the principal effect of SES on vocabulary development occurs prior school entry.

Discussion

Overall, the critical appraisal of evidence included in this review suggests that low-SES has a significant negative effect on the vocabulary development of typically developing children prior to school entry. All 5 studies discussed, provide suggestive Level III evidence that in the first 3- years of life, children from families of low-SES
develop significantly smaller vocabularies than their peers from higher socioeconomic backgrounds. The evidence suggests that the effect of low-SES may be evident as early as 18-months of age.

Difficulties in directly comparing these studies arise from methodological variations. Definitions of SES lack wide-spread agreement. Hart and Risley (1995) grouped families based on parent occupation while Fenson et al. (1998) used overall household income. Rescorla and Achenbach (2002) and Fernald et al. (2013) measured SES with the Hollingshead Index of Social Status while Farkas and Beron (2004) used a multigenerational measure that included grandparent education. The construct of SES may never be simply defined as it remains unclear what subcomponents predict an individual's ability to access societal resources.

Differences in measuring vocabulary across the studies also presents challenges for direct comparisons. Measures included the PPVT (Farkas & Beron, 2004), the LDS vocabulary score (Rescorla&Achenbach,2002), longitudinally recorded vocabulary production (Hart & Risley, 1995) and the MacArthur CDI (Fenson et al., 1998; Fernald et al., 2013). Although potential limitations surrounding the validity of parent report have been discussed, research has suggested that the MacArthur CDI is a valid measure of children's language abilities (Thal, O'Hanlon, Clemmons & Fralin, 1999). It has been further suggested that parent report provides a more representative picture of a young child's skills than data obtained in a laboratory setting. Such evidence is of high importance to this area of research as parent report is among the few methods currently used to assess vocabulary development in children prior to 3-years of age.

Despite the challenges discussed above, it is interesting to cross-examine the literature to investigate when the association between low-SES and vocabulary acquisition becomes evident. Multiple studies found the effect of low-SES to be present prior to 3-years of age (Farkas & Beron, 2004; Fenson et al., 1998; Rescorla & Achenbach, 2002). Hart and Risley (1995) revealed a statistically significant vocabulary gap between children of varying SES as early as 24-months and suggested that as soon as children began speaking (10- to 14- months of age) social class differences in the sizes of their vocabulary were evident. The most recent study by Fernald et al. (2013) concluded that SES-related differences in vocabulary and language skills emerged as early as 18-months.

There were few indicators in the present evidence to explain the vocabulary discrepancy in SES groups. Based on the finding that parents from high socioeconomic backgrounds spoke to their children significantly more (an average of 2153 words per hour)than parents from low socioeconomic backgrounds (average of 616 words per hour), Hart and Risley (1995) attributed the effect of SES on children's vocabulary development to differences in the quantity of language children heard. When extrapolated, the study revealed that by age 4, a child from a family on welfare could have heard 32-million words fewer than a peer from a family of high-SES. No effect was found for the quality or richness of the language that parents in different socioeconomic groups produced.

Other studies have investigated different factors to account to the SES discrepancy. Hoff (2003) suggested properties of maternal speech that differed as a function of SES fully accounted for the differences in vocabulary of children from varying socioeconomic backgrounds. Hoff concluded that it was the quality of infants' early language environment that mediated the link between SES and vocabulary knowledge. This finding has been replicated by Cartmill et al. (2013).

Similarly, though not to the same degree, Farkas and Beron (2004) found that more than 50% of the impact of social class on early vocabulary development was accounted for by high verbal scores of mothers from higher social classes and high scores on a home environment questionnaire combining measures of

cognitive stimulation, maternal warmth toward the child, and the provision of a safe and clean environment.

Bornstein, Haynes and Painter (1998) utilized structural equation modeling to determine several unique predictive factors of a child's vocabulary competence as a function of SES. They found that the mother's verbal intelligence, personality, attitudes toward parenting and knowledge of child development all varied as a function of SES and had a significant effect on child vocabulary development. This multivariate model may be useful in future research regarding the factors that contribute to the effect of low-SES on vocabulary development.

Clinical Implications & Recommendations

As Speech-Language Pathologists, it is crucial to be aware of how early in development low-SES may impact a child's vocabulary acquisition. Given that research suggests vocabulary knowledge is fundamental to reading comprehension and literacy success, the importance of early intervention to bridge the vocabulary gap between children of varying socioeconomic backgrounds cannot be overstated (Christ & Wang, 2010). The study by Farkas and Beron (2004) revealed that the highest rate of vocabulary growth occurred during the preschool years. Thus, the importance of the early experiences in the first 3-years of a child's life must not be underestimated. Interestingly, their research further suggested that oral vocabulary growth rates were relatively similar across children from varying social background from age 5 and beyond. This suggests that, although the vocabulary gap remains, kindergarten attendance may have a significantly positive impact on oral language development. Such evidence provides substantial support for early intervention programs with an explicit focus on oral language.

Over the years, the research discussed in this critical review has been utilized to obtain government funding for early childhood programs. Recently, researchers have suggested that such results must be framed as a public health message with the goal of helping caregivers understand the role they can play in building the skills their child requires for optimal development (Knudsen, Heckman, Cameron & Shonkoff, 2006).

As SLP's working with this population it is important to consider how this evidence might fit into different theoretical models. Several professionals view these differences in vocabulary development from children of varying SES as deficiencies. In this deficit model, parent's of low-SES are deemed responsible for passing on inadequate language skills and are blamed for their child's poor oral language abilities. An alternate model suggests that the results of the reviewed literature simply reveal differences in children's skills and experiences upon school entry rather than deficiencies among those of low-SES. This model acknowledges that all children come to school with a variety of linguistic and intellectual resources, but that not all children present with the same resources (Dudley-Marlin & Lucas, 2009). In this model, it is the role of the teachers and SLP's to draw on the current resources and strengths of each child to help them develop the skills required for literacy and academic success.

The next step in this area of research is to continue to explore the subcomponents of SES that contribute to the differences in children's early oral language development. By having a greater understanding of the impact of low-SES and the contributing factors, SLP's are able to work alongside educators to best support disadvantaged children when they enter school.

References

Arriga, R.I., Fenson, L., Cronan, T., & Pethick, S.J. (1998). Scores on the MacArthur Communicative Development Inventory of children from low- and middle- income families. Applied Psycholinguistics, 19, 201-223.

Bornstein, M. H., Haynes, O. M., & Painter, K. M. (1998). Sources of child vocabulary competence: A multivariate model. Journal of Child Language, 25, 367-394.

Cartmill, E. A., Armstrong, B. F., Gleitman, L. R., Goldin-Meadow, S., Medina, T. N., & Trueswell, J. C. (2013). Quality of early parent input predicts child vocabulary 3 years later. Proceedings of the National Academy of Sciences, 110(28), 11278-11283.

Christ, T. & Wang, X.C. (2010). Bridging the Vocabulary Gap: What the Research Tells Us about Vocabulary Instruction in Early Childhood. Young Children, 65(4), 84-91.

Dickinson, D.K., & Neuman, S.B. (Eds.). (2007). Handbook of early literacy research (Volume 2). Guilford Press.

Dudley-Marling, C., & Lucas, K. (2009). Pathologizing the language and culture of poor children. Language Arts, 362-370.

Dunn, L., and Dunn, L. (1997). Peabody Picture Vocabulary Test - III. San Antonio, TX: PearsonAssessments.

Farkas, G., & Beron, K. (2004). The detailed trajectory of oral vocabulary knowledge: differences by class and race. Social

Science Research, 33, 464-497.
Fernald, A., Marchman, V., & Weisleder, A. (2012). SES differences in language processing skill and vocabulary are evident at 18 months. Developmental Science, 16(2), 234-248.
Hart, B. & Risley, T. (1995). Meaningful differences in the everyday experience of young American children. Baltimore: Paul H. Brookes Publishing. (2004 printing).
Hoff, E. (2003). The specificity of environmental influence: Socioeconomic status affects early vocabulary development via maternal speech. Child development, 74(5), 1368-1378.
Hoff, E. (2006). How social contexts support and shapelanguagedevelopment. Developmental Review, 26, 55-88.
Ginsborg, J. (2006). The effects of socioeconomic status on children's language acquisition anduse.Languageandsocial disadvantage: Theory into practice, 9-27.
Hollingshead, A. A. (1975). Four-factor index of social status. Unpublished manuscript, Yale University, New Haven, CT.
Knudsen, E. I., Heckman, J. J., Cameron, J. L., & Shonkoff, J. P. (2006). Economic, neurobiological, and behavioral perspectives on building America's future workforce. Proceedings of the National Academy of Sciences, 103(27), 10155-10162.
Lonigan, C.J., Burgess, S.R., & Anthony, J.L. (2000). Development of emergent literacy and early reading skills in preschool children: evidence from a latent variable longitudinalstudy.Developmental Psychology, 36, 596–613.
NHMRC (2009). Additional levels of evidence and gradesforrecommendationsfor developers guidelines. Canberra: National Health and Medical Research Council. Retrieved from www.nhmrc.gov.au
Ramey, C.T., & Ramey, S.L. (2004). Early learning and school readiness: can early intervention make a difference? Merill-Palmer Quarterly, 50, 471-491.
Rescorla, L., & Achenbach, T. M. (2002). Use of the Language Development Survey (LDS) in a national probability sample of children 18 to 35 months old. Journal of Speech, Language, and Hearing Research, 45(4), 733-743.
Riessman, F. (1962). The culturally deprived child. New York: Harper & Row.
Thal, D. J., O'Hanlon, L., Clemmons, M., & Fralin, L. (1999). Validity of a parent report measure of vocabulary and syntax for preschool children with language impairment. Journal of Speech, Language, and Hearing Research, 42(2), 482.