Commentary: Otitis Media: Consistency Is the Hobgoblin?

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Otitis media is one of the most common affictions of early childhood. Few children escape the preschool years without experiencing at least one episode; many children experience repeated episodes. In a prospective study, Teele et al. (1984) reported that two out of three children had at least one episode and that by the time the children were 3 years of age, one of three had had three or more episodes. This condition brings attendant problems; one concern is that these infections are most prevalent during the developmental epoch during language acquisition.

The primary acute behavioral impact of otitis media is compromise of hearing sensitivity resulting in degraded speech perception. Attenuation of speech perception during a developmental epoch that is crucial for the development of speech and language could adversely affect language development, oral and written, and perhaps even cognitive development. Multiple episodes of middle ear effusion (MEE) could be a precursor to a speech discrimination and accuracy problem, or they might induce the child to become a habitually imprecise listener.

Given that the primary behavioral sequela is in speech perception and discrimination, the locus of longer-term effects will more likely be in the morphologic than in the semantic components of language. Contemporary research on reading has emphasized that phonologic awareness at the linguistic level is an important prerequisite for the acquisition of reading skills (Stanovich & Siegel, 1994). Theoretically, early compromise of speech perception could, therefore, adversely affect phonologic awareness as well as oral and written language skills.

As Johnson et al. (this issue) point out in their review of the literature, some have argued (Eimas & Clarkson, 1986) that persistent middle ear effusion, which can cause partial and intermittent impairment of hearing, can pose a threat to language development. Others have countered that any acute impairments will ultimately be compensated in the child’s development (Feldman & Gelman, 1986). Major longitudinal studies (Friel-Patti, Finitzo, Formby, & Brown, 1987; Peters, Grievink, Bon, & vanSchilder, 1994; Teele et al., 1990) have failed to resolve this question, suggesting overall that any effects are likely subtle and perhaps inconsistent across individuals.

The current issue of Journal of Pediatric Psychology brings two more contributions to this literature. The first, by Johnson et al., uses an enviable longitudinal database wherein a very large sample of children was identified at birth and followed prospectively for 7 years. Occasions of MEE were carefully documented, and cognitive testing was performed at three time points: 3, 5, and 7 years. Using growth curve analysis, a developmental methodology in which the shape of the growth curve itself, over multiple time points, becomes the outcome variable, they demonstrated that there was no overall effect of duration of MEE. Children whose MEE had occurred between 6 and 12 months of age, however, showed a modest and temporary delay in cognitive

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development at 3 years of age with catch-up achieved by the 5th- and 7th-year measurement points.

By contrast, the second contribution, by Kindig and Richards, approaches the problem retrospectively. They recruited from the practice of a pediatric otolaryngologist children who had experienced four or more episodes of otitis media before 3 years of age and compared them to a community sample whose parents reported that they had experienced only one or no episodes of otitis media before the age of three. The children were compared for reading competence. Unlike the first study, this one documented consistent differences favoring the children who reportedly had not had multiple episodes of otitis media.

These two studies make a useful contrast, as each has important strengths, but also weaknesses that limit the conclusions. The methodology of Johnson and colleagues is one that developmental psychologists aspire to-following an epidemiologic cohort from birth and tracking the incidence of the disease and its behavioral sequelae. The data on MEE can be well quantified, socioeconomic and environmental factors are documented as moderators, and the longitudinal design captures the catch-up that a cross-sectional design would surely have missed. The singular focus on the Stanford-Binet IQ test, however, is somewhat unsatisfying. As suggested above, the most direct impact of otitis media would likely be on phonologic and morphologic aspects of language development, not on semantics and only remotely on general cognitive abilities. Thus, despite the impressive features of the design, this study may have missed the outcome of greatest theoretic interest and clinical importance, that is, whether early compromise of speech perception could have a downstream effect on phonology and hence oral and especially written language. Similarly designed studies, however, that have applied more appropriate measures, have in fact reported the same type of modest and somewhat equivocal result (Peters et al., 1994).

By contrast, the retrospective study of Kindig and Richards (this issue) takes reading as its primary focus. Here, in contrast to the Johnson study, and indeed in contrast to several of the larger prospective studies (Friel-Patti et al., 1987; Peters et al., 1994), more consistent differences emerge, suggesting a clear adverse effect of early otitis media on outcome.

Some caution, however, needs to be exercised in interpreting these results. First, the reliability of retrospective reports of frequency and duration of otitis media episodes is questionable, even with physician records (Paden, 1994). Second, in any study where academic achievement is the outcome, multiple risk factors need to be carefully and explicitly considered. For example, examination of the WISC results in this study indicates that the control group shows a mean Verbal Comprehension (VC) factor score of 126 compared to 114 for the otitis media group. For both groups, the Perceptual Organization (PO) and Freedom from Distractibility (FD) factor scores were lower and equivalent. Thus, the unusually high VC scores (nearly 2 standard deviations above the mean) in the control group appear to be the outliers here. Even the otitis media group in this study scores a standard deviation above the mean. VC can be especially sensitive to language experience; and although the authors indicate that the groups were matched for SES, the matching criteria are not specified, nor are data shown that document the socioeconomic status of these children.

The use of nonstandardized reading tests in a research context is troublesome. Many well-standardized, reliable, and valid tests are available for assessing reading, and these might have made the findings more interpretable. Finally, investigating with language measures sensitive to phonology and morphology, to determine in greater detail the linguistic basis for the reading problems, would have been of considerable interest.

An important difference between the two studies is that the children who participated in the Kindig and Richards study were older when tested, 8 to 10 years of age rather than 7 years. Seven-year-olds are beginning readers, and although more severe reading problems will typically be manifest by that age, less severe reading deficits often become apparent only with the challenge of more complex materials and demands for rate and fluency in the upper grades. It is certainly plausible that a mild-to-moderate difference related to early deficits in speech discrimination might not yet be detectable in beginning readers but would become more evident when the children are 9 or 10 years of age.

Perhaps the ideal methodology would be a combination of the approaches of these two studies: detailed testing of skills sensitive to phonological processing at an older age in children followed longitudinally from birth. As it stands, these two studies make an important contribution in adding more
data pertinent to the problem, but they are most consistent with the extant literature in their inconsistency.

References


