Survey of Auditory Processing Protocols and Perceptions of Speech-Language Pathologists in Comparison With Perceptions of Audiologists

Diana C. Emanuel
Caitlin Marczewski
Stephanie Nagle
Karen Fallon
Towson University, Towson, MD

In 2010, the American Academy of Audiology (AAA) assembled a group of experts in auditory processing disorder (APD) to discuss assessment and intervention aspects of the disorder. The objective of this meeting was to establish clinical guidelines for the screening and assessment of, were satisfied with intervention recommendations provided by Auds in APD reports; however, many SLPs indicated that Auds’ APD reports should be more individualized and practical. Recommendations for APD intervention by Auds tend to focus on environmental modifications, whereas recommendations by SLPs tend to focus on compensatory and remedial therapy techniques.

Conclusion: Differences exist between protocols and perceptions of Auds and SLPs in APD service provision. The types of therapy provided by SLPs differ somewhat from those recommended by Auds in APD reports. It is recommended that SLPs and Auds work together more closely in intervention for children with APD. University programs are encouraged to use interprofessional training models to enhance patient-centered and collaborative care for individuals with APD.

KEY WORDS: auditory processing, auditory processing disorder, clinical protocols, speech-language pathologists, audiologists

ABSTRACT: Purpose: A survey of speech-language pathologists (SLPs) was conducted to examine their auditory processing (AP) practice patterns, their perceptions of the roles of various professionals in the care of individuals with auditory processing disorder (APD), and their perception of the clinical reports received from audiologists (Auds) for children who have been diagnosed with APD. These results were compared with the opinions of Auds from an earlier survey (Emanuel, Ficca, & Korczak, 2011).

Method: Surveys from 183 American Speech-Language-Hearing Association-certified SLPs who work with children with APD were analyzed. Questions included participant demographics; procedures for screening, assessment, and intervention of APD; and opinions of APD reports received from Auds.

Results: SLPs often conduct APD screening and intervention and occasionally conduct APD assessment. SLPs are more likely than Auds to use classroom observation for APD screening. Auds are more likely than SLPs to use tests that include acoustically modified stimuli for diagnostic testing. Half of the SLPs

110 CONTEMPORARY ISSUES IN COMMUNICATION SCIENCE AND DISORDERS • Volume 42 • 110–121 • Spring 2015 © NSSLHA 1092-5171/15/4201-0110
and intervention for APD and to discuss the importance of a multidisciplinary team. Earlier meetings of the American Speech-Language-Hearing Association (ASHA, 2005a, 2005b) and the Bruton Conference (Jerger & Musiek, 2000) had similar objectives. These conferences and subsequent reports provided definitions of APD, suggested criteria for its diagnosis and intervention, and discussed the roles of various professionals. Although the importance of multiple disciplines was emphasized, these reports only vaguely described the role of the speech-language pathologist (SLP).

APD refers to the inefficiency or inability of the central nervous system to synthesize auditory stimuli (AAA, 2010). Individuals with APD may have weaknesses in one or more of the following areas: speech recognition, speech discrimination, localization, temporal processing, and/or understanding degraded speech such as filtered speech or speech in the presence of background noise (AAA, 2010; ASHA, 2005a; Chermak & Musiek, 2007; Moore, 2007). Children with APD may also appear to have difficulty attending to auditory stimuli, following directions, and/or remembering verbal directions. Furthermore, children with APD often ask teachers to repeat information and may have a poor appreciation for music (AAA, 2010; Chermak & Musiek, 2007; Friel-Patti, 1999).

APD includes diverse symptoms that may mimic or be comorbid with other developmental disorders such as attention deficit hyperactivity disorder, learning disabilities, language impairments, reading disorders, and writing disorders; therefore, children with these disorders are often under the care of SLPs, psychologists, and education specialists (AAA 2010; Bamiou, Musiek, & Luxon, 2001; Cameron & Dillon, 2005; Hall, Riley, & Moore, 2011; Lagacé, Jutras, & Gagné, 2010; Moore, 2007; Sharma, Purdy, & Kelly, 2009; Witton, 2010).

Witton (2010) estimated that more than 10% of children may have APD. As with all estimates of prevalence, this figure is influenced by the diagnostic criteria that are used to determine APD, and it may be an exaggerated estimate due to comorbidity with other disorders displaying similar symptoms (McFarland & Cacace, 2003; Sharma et al., 2009). Sharma et al. (2009) suggested that the occurrence of APD, in the absence of other developmental disorders, is much lower than this estimate. They assessed 68 school-age children to determine the comorbidity of APD with language impairment and reading disability and found that only 4% of the children had APD exclusively (Figure 1). Language and reading disorders were comorbid with an APD diagnosis for 47% of the children. The high comorbidity of APD with other disorders associated with overlapping symptomology

**Figure 1.** Comorbidity of auditory processing disorder (APD), reading disorder, and/or language impairment.

<table>
<thead>
<tr>
<th>Test Battery</th>
<th>Auditory Processing Disorder</th>
<th>Reading Disorder</th>
<th>Language Impairment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Passed all</td>
<td>4%</td>
<td>10%</td>
<td>10%</td>
</tr>
<tr>
<td>Test Battery</td>
<td></td>
<td>47%</td>
<td>7%</td>
</tr>
<tr>
<td></td>
<td>(3)</td>
<td>(7)</td>
<td>(5)</td>
</tr>
</tbody>
</table>


suggests that a team approach to assessment is prudent. Based on the high co-occurrence of language-based disorders with APD, the team should include an audiologist (Aud) and an SLP at a minimum.

A number of published reports have provided guidelines for APD assessment (e.g., ASHA, 1996; Jerger & Musiek, 2000). ASHA (2005a) and AAA (2010) provided general suggestions for APD diagnosis and management, including specifications that assessment and intervention should be patient centered and multidisciplinary, include validated tests using verbal and nonverbal stimuli, assess various levels and processes of the brain, and be reasonably short. Further, both documents recommended that temporal processing, dichotic processing, and monaural auditory closure skills should be assessed. According to a recent survey (Emanuel et al., 2011), most Auds are following these general guidelines.

Published protocols from other sources also provide guidance in AP assessment. For example, Jerger and Musiek (2000) summarized the consensus of AP experts who convened at the Bruton Conference. Among their recommendations was the suggestion that both behavioral and electrophysiological tests should be used for APD assessment. Two subsequent surveys of Auds (Emanuel, 2002; Emanuel, Ficca, & Korczak, 2011) indicated that few Auds were following the Bruton Conference protocol. Specifically, only 10%–15% of Auds were conducting electrophysiological tests as part of the AP battery. In contrast,
behavioral tests were used by 100% of the Auds as part of the AP battery.

One of the most commonly used electrophysiological tests in the field of audiology is the auditory brainstem response (ABR) test. The ABR test is associated with good sensitivity and specificity for identifying the presence of neoplasms of the VIII nerve and lower brainstem; however, this test has not been found to be useful as part of the AP battery in the absence of other indicators of retrocochlear pathology (Hall & Johnston, 2007; Hall & Mueller, 1997; Koors, Thacker, & Coelho, 2013). Electrophysiological tests of higher level functioning (i.e., middle latency response, late cortical and event-related potentials) have utility in diagnosing APD and may provide a more direct assessment of neural function in auditory parts of the brain compared with behavioral tests (Klein et al., 1995; Marvel, Jerger, & Lew, 1992; Schochat, Musiek, Alonso, & Ogata, 2010).

However, these tests are not commonly used by Auds as part of an AP battery, likely because they are time consuming, require highly specialized clinical equipment, and have limited normative data (AAA, 2010; Jerger & Musiek, 2000). Thus, according to the available data, AP diagnostic protocols used by Auds include behavioral testing as the primary method of assessment. Recommended criteria for the diagnosis of APD using behavioral tests is failure in at least one ear of two AP tests, where failure corresponds to scores outside 2 SDs from the mean score of a normal, same-age cohort (AAA, 2010; ASHA, 2005a).

**Scopes of Practice**

According to ASHA (e.g., 2005b), auditory and speech-language screenings are within the jurisdiction of both Auds and SLPs. However, assessment for the purposes of diagnosis is restricted to Auds for audiological disorders and to SLPs for speech-language disorders. Assessment for the diagnosis of APD may be perceived as a grey area. Although definitions of APD usually include an anatomical basis within the central auditory nervous system, this system includes processing within the same higher level centers that are the focus of speech-language assessment. There is no clear anatomical demarcation between cortical areas/fiber pathways that are solely the domain of the Aud compared with those of the SLP. Beyond the anatomical considerations, AP and APD definitions often include a list of skills and deficits, respectively, that may overlap between disciplines; speech discrimination is one such example.

Although most of the AP assessment that is conducted by Auds involves the use of acoustically modified stimuli and specialized test equipment, a number of assessments are face-to-face response tests, which can be used by multiple professionals. For example, the Test of Auditory Processing Skills—Third Edition (TAPS–3; Martin & Brownell, 2005), according to the publisher, can be administered by “speech-language pathologists, audiologists, special education and resource teachers, and other clinicians who are knowledgeable about a child’s use of auditory information” (Linguisystems, 2005, p. 2). The Auditory Processing Abilities Test (APAT; Academic Therapy Publications, 2013) also includes a varied list of professionals who can administer the test. Emanuel (2002) reported that 15% of Auds (not dually certified) reportedly administer traditional speech-language/psychoeducational tests as part of their AP battery, and more than 20% assess auditory memory, indicating an overlap in the assessment areas required for APD diagnosis. A survey of Auds indicated that 97% of respondents felt that the diagnosis of APD was the responsibility of the Aud, and only 16% felt that SLPs were qualified to make a diagnosis of APD (Emanuel et al., 2011). Once a diagnosis is made, however, the majority of Auds from the Emanuel et al. (2011) study indicated that it was the responsibility of other professionals, mainly SLPs, to provide treatment. The corresponding viewpoint from SLPs has not been investigated.

According to ASHA (2005b), intervention for APD (which includes direct treatment, or therapy, to improve auditory processing abilities as well as management strategies such as modifications) is within the scope of practice for educators, SLPs, and Auds. In Emanuel et al. (2011), the majority of Auds felt that APD treatment should be provided by SLPs (74%) and educators (52%), whereas fewer felt that APD treatment should be provided by Auds (40%). This suggests that SLPs were viewed by Auds as the primary provider of APD therapy. Limitations in the provision of APD treatment by Auds include reimbursement, time, and school-system restrictions (DeBonis & Moncrieff, 2008; Emanuel et al., 2011).

Although 81% of Auds reportedly provide intervention recommendations in APD reports, these recommendations often consist of environmental modifications (e.g., preferential seating, FM systems) and seldom include therapy-based recommendations (Emanuel et al., 2011). This finding suggests that Auds may receive better training and more experience in the area of environmental modifications and are therefore more comfortable making these types of recommendations. There are no studies to date indicating whether SLPs who receive APD reports from Auds find these report recommendations to be useful. Further, there is no prior study of SLPs’ opinions regarding who should be conducting APD screening, assessment, and intervention.
Summary and Study Rationale

APD is a disorder of the central auditory system with complex presentation that is commonly comorbid with language disorders. SLPs’ expertise in the differential diagnosis of language disorders makes them an important part of a multidisciplinary APD team (Chermak, Silva, Nye, Hasbrouck, & Musiek, 2007). In our clinical experience, a problematic issue has been the lack of synergy between Auds and SLPs in the service delivery model for individuals with APD, especially related to the connection between assessment and intervention recommendations. Specifically, in our opinion, it appears that Auds and SLPs are working to provide best practice services in APD, and yet these two professions are disparate in their efforts, resulting in a disarticulated approach to the care of children with APD. With the emerging focus in health care on the need for patient-centered care, the need for an integration of medical services is essential. In the patient-centered care model, personnel and other medical resources are organized to focus on the needs of individual patients rather than on separate specialty centers (Sherer, Anderson, & Lumsdon, 1993).

The role of the SLP in the screening and assessment of, and intervention for, APD remains somewhat unclear in typical clinical practice. Some data from Emanuel et al. (2011) are available on Auds’ perceptions of the role of the SLP; however, SLPs’ views of their role in APD have not been examined. As the scope of practice of health care professionals should be determined by those professionals and not by other professionals, the views of SLPs in this matter are important. Further, considering the importance of patient-centered care, optimal strategies for synergy between varied professionals in the assessment of and intervention for APD should be developed. This study represents another step in the process toward understanding the current status. Specifically, the purpose of this study was to survey SLPs who provide APD services so as to examine their current clinical practices, their perception of the roles of various professionals in the care of individuals with APD, and their perception of the clinical reports received from Auds for children who have been diagnosed with APD.

Method

We created a survey and distributed it to ASHA-certified SLPs. The survey was reviewed by Towson University’s Institutional Review Board for the Protection of Human Subjects and was classified as “exempt.”

Survey Creation

The survey included 37 closed-set questions and one box for additional comments. The survey was modeled on the APD protocol survey that was used by Emanuel et al. (2011). Both similar and new questions were used so that comparisons could be made between the two studies but additional data could also be obtained regarding SLPs’ opinions of Auds’ APD diagnostic reports and intervention recommendations. The current survey included four sections: (a) demographics; (b) opinions on which professional(s) are responsible for AP assessment and treatment; (c) clinical protocols for screening, assessment, and intervention; and (d) feedback on the content of APD reports received from Auds. Similar to the Emanuel et al. survey, our survey was limited to an examination of APD in children. APD can be examined in adults and special populations (e.g., traumatic brain injury); however, the current study focused solely on this subpopulation.

Survey Dissemination

We purchased the names of 1,000 potential survey participants from the ASHA membership database. A random sample of SLPs with the following constraints was requested: (a) SLPs must have APD listed as a clinical specialty area, (b) SLPs must provide services for children ages 6–17 years, and (c) the sample should be stratified based on geographic locations across the United States. Initially, 700 surveys were distributed between February and March 2011. These data were analyzed as part of a doctoral thesis (Marczewski, 2013). Following analysis, it was determined that one additional response item related to the use of recommendations included in AP reports from Auds should be added to the questions. In addition, some of the respondent comments in the initial survey indicated that assessments were conducted as a part of a team; therefore, we added a question in the second survey to clarify if SLPs conducted assessments as part of a team or independently. The modified survey was mailed to the remaining 300 addresses in January 2012. All of the data were analyzed for the combined sample, with the exception of the few questions that were modified in the second sample.

Results

Completed surveys were received from 187 respondents (146 from first mailing, 41 from second), yielding a total response rate of 19%. The low response
rate was attributed to the comprehensive nature of the survey (seven pages). However, the demographics suggested that in regard to gender and work setting, the sample was representative of ASHA members in general. Four surveys were discarded because of incomplete data, yielding 183 surveys for analysis.

Demographics

Most respondents were female (95%) and held a master’s degree as the terminal degree (97%). All of the respondents were SLPs, but a few also held dual licensure or certification in the field of audiology (4%), psychology (12%), education (10%), and/or reading (2%). The primary work setting was school system (65%) followed by private practice (19%), with fewer than 5% reported for any other specific work site. All of the respondents worked with children, with the largest number of respondents working with children ages 7–10 years (78%) and 11–14 years (57%) and fewer working with children ages 3–6 years (32%) and 15–18 years (25%). Almost all of the respondents (98%) had more than 6 years of experience working with children with APD, and the majority (76%) had more than 11 years of experience. In response to the question, “Do you consider yourself to be an expert in APD?” 7.7% of the respondents selected yes, 54.6% selected somewhat, and 37.7% selected no.

AP Opinion Questions

SLP opinions on scope of practice. SLPs were asked to indicate which professionals they felt were qualified to screen, diagnose, recommend treatment, and provide treatment for children with APD. The answers to these questions are shown in Figure 2. The vast majority of SLPs believed that both Auds (94%) and SLPs (93%) were qualified to screen for APD, with fewer indicating psychologists (34%) or other professionals. Generally, most SLPs (97%) agreed that diagnosis should be done by Auds, whereas 36% of respondents selected yes, 54.6% selected somewhat, and 37.7% selected no.

Figure 2. Percentage of respondents who indicated audiologists (AUD), speech-language pathologist (SLP), psychologists (PSY), special educators (SPED), classroom teachers (TEACH), and otolaryngologists (ENT) were qualified to screen, diagnose, recommend remedial treatment (Recc Remedial Tx), provide remedial treatment (Provide Remedial Tx), recommend technology-based modifications (Recc Tech Mods), and recommend nontechnology based modifications (Recc Non-Tech Mods).
felt that an SLP was qualified to diagnose APD. The vast majority of SLPs felt that Auds could recommend remedial therapy (91%) and technology (99%) and nontechnology-based (85%) environmental modifications, with a smaller majority indicating that Auds could provide remedial therapy (62%). Responses from SLPs regarding SLP qualifications indicated similar percentages to Auds for recommending remedial therapy (85%) and recommending nontechnology-based modifications (93%). However, SLPs were more likely than Auds to indicate that SLPs could provide remedial therapy (99%) and less likely to indicate that they could recommend technology-based treatment (64%).

More than one third of the SLPs indicated that psychologists (36%) and special education teachers (51%) were qualified to recommend nontechnology-based environmental modifications, but fewer than 30% felt that any other professional (e.g., otolaryngologist, neurologist, developmental pediatrician) was qualified to be involved with the treatment aspects of APD.

Chi-squared analyses between SLPs’ self-rating of their expertise and their response to the questions regarding if SLPs are qualified to screen or diagnose APD were not significant (p > .05); however, the SLPs’ self-rating was significantly related to the questions that asked if the respondent actually screened for APD, \( \chi^2(2) = 16.368, N = 183, p < .05 \), or diagnosed APD, \( \chi^2(2) = 16.368, N = 177, p < .05 \). Specifically, it was more likely that the SLP would screen for and assess APD if he or she self-identified as being an expert or somewhat of an expert. For screening, 38% of the SLPs who rated themselves as not an expert conducted APD screening compared to 53% and 65% for somewhat of an expert or an expert, respectively. AP diagnostic tests were administered by 14%, 38%, and 29% of SLPs who were self-rated as not an expert, somewhat an expert, and an expert, respectively.

**SLP APD protocols.** Just more than half of the SLPs indicated that they screened or diagnose APD (56%). The most common procedures for screening included classroom observation (67%), parent interview (63%), SCAN–A/C\(^1\) (combined survey) test (34%), and SCAN–3 (Keith, 2009; 29%). Fewer SLPs (28%) indicated that they administered APD diagnostic tests; however, three of these SLPs were dually certified. When these three were disregarded, 27% of the SLPs indicated that they administered APD diagnostic tests.

Recall that a question was added in the modified survey to clarify if SLPs conducted diagnostic tests as part of a team or independently. Based on the responses from the modified survey, approximately one third (36%) of the SLPs who conduct diagnostic tests conduct these tests independently rather than as part of a team, and none of those SLPs was dually certified in audiology. However, this represented a small subsample and should be considered pilot data for future exploration of this topic.

Before APD management, the majority of SLPs reported that they require assessments from other professionals (93%)—primarily audiological (89%), educational (55%), and psychological (50%). Before AP assessment, the majority of SLPs reported that they require parent questionnaire (81%), teacher questionnaire (73%), case history form (73%), and referral by an IEP team (60%). For the 49 SLPs who conduct AP assessments, most (90%) reportedly conduct between one and three tests as part of the AP assessment, but fewer than a third reported specific tests grouped within the categories of dichotic listening (28%), monaural low redundancy (23%), temporal processing (17%), or binaural separation/integration (18%).

**Reports received from Auds.** The majority of SLPs (79%) reported receiving APD diagnostic reports from Auds. Reports were received primarily from Auds in private practice (66%), hospital/multidisciplinary clinics (59%), universities (30%), and schools (28%). SLPs were asked to rate their satisfaction with the treatment/management recommendations included in the Auds’ AP reports on a 5-point scale from very satisfied to very unsatisfied, with neutral as the center category. Ratings of somewhat or very satisfied were selected by 50% of the SLPs, with 12% selecting neutral and 38% selecting very or somewhat unsatisfied. Fifty-eight SLPs provided a response to an open-ended question asking what changes they would like to see in the AP reports from Auds; 29 (50%) indicated that the recommendations should be more individualized; 12 (21%) indicated that the recommendations should be more practical for the school setting; and seven (12%) wanted more information about student weaknesses, such as an indication of the severity of the disorder or a better explanation of the test results (Note that practical encompassed the terms practical and realistic as well as similar terms combined across comments).

SLPs indicated on a 5-point scale (never, rarely, sometimes, often, and always) how often Auds’ reports included recommendations that were tailored specifically for the patient/child. The majority of SLPs indicated that Auds often or always included environmental modifications (72%) and most often included FM systems, preferential seating, and gaining the student’s attention (>70%). Slightly fewer than half of the SLPs

---

\(^1\)SCAN–A is the Test for Auditory Processing Disorders in Adolescents and Adults (Keith, 1991) and SCAN–C is the Test for Auditory Processing Disorders in Children—Revised (Keith, 2000).
reported receiving individualized recommendations for compensatory strategies (42%) and remedial therapy (48%).

A list of intervention strategies in the categories of environmental modification, compensatory strategies, and remedial therapy was provided in the survey. For each intervention strategy, SLPs were asked to indicate if the Aud’s AP reports included the intervention and if the SLP used the intervention. The results are shown in Figure 3. Examination of this figure indicates that SLPs are employing interventions across all three categories, with 50% or more reportedly using seven of the nine listed compensatory strategies, six of the eight remedial strategies, and seven of the eight environmental modifications. Thus, it appears that the SLP approach to intervention for the treatment of APD is multifaceted. Auds’ reports received by SLPs most often include environmental modifications, with six of the eight listed items selected by more than 50% of SLPs and three of these selected by more than 70%. However, compensatory strategies and remedial therapies were less commonly recommended by Auds, with only two items selected by 50% or more of the respondents and no single item in either category selected by more than 58% of the respondents.

DISCUSSION

SLPs’ and Auds’ Perceptions

Screening and diagnosis. Our intent was to survey SLPs who were frequently involved in APD

Figure 3. Percentage of SLPs who selected specific management or treatment options from the three categories of compensatory strategies, remedial therapy (i.e., skills-based training), and environmental modification. Black lines indicate SLPs who received a recommendation by an Aud and delivered that treatment/management option; grey lines indicate additional SLPs who delivered that treatment/management option without Aud recommendation.
cases. This was the reason the targeted mailing was sent to SLPs who listed APD as a specialty area in their ASHA membership information. Although the majority of SLPs (62%) indicated that they were an expert or somewhat of an expert in the area of APD diagnosis, it is curious that just more than one third of the sample (38%) indicated no in response to the question “Do you consider yourself to be an expert in central auditory processing?” The clinical areas are self-selected as part of the ASHA membership application, so there appears to be a disconnect between the reported level of clinical skill expertise and a willingness to provide a service in that area. However, it is possible that some SLPs are skilled at screening and/or intervention of APD but not at the assessment of APD, and it is this missing piece that detracts from the self-rating of expertise. This is supported by the significantly greater likelihood that SLPs with a better self-rating of expertise would conduct APD assessment.

Because many of the questions in the current survey of SLPs parallel those in an earlier survey of Auds (Emanuel et al., 2011), we made several comparisons. Approximately half of both SLPs from the current survey and Auds from the prior survey conduct APD screening. The majority of both groups use questionnaires and parent interviews/case history as part of the screening process. SLPs were more likely than Auds to use classroom observation (67% SLP vs. 33% Aud) as part of the screening, which is not surprising. A recent survey of work settings reported by ASHA-certified SLPs and Auds indicated that the most common worksite for SLPs was the school system (53%), and this was among the least common for Auds (8%) (ASHA, 2014). Further, the current survey responses indicated that less than one third (28%) of the AP reports received by SLPs were from Auds in the school system. Thus, most SLPs involved with APD will have easier access to the classroom than Auds. The proximity of SLPs to the classroom allows them to provide unique input to the APD screening, assessment, and intervention processes relative to the impact of APD on the child’s academic performance.

There was agreement between the two surveys regarding the role of the Aud in APD diagnosis. Specifically, the vast majority of both professions (93% Aud survey; 93% SLP survey) considered Auds to be qualified to diagnose APD. Both samples included a minority of individuals who agreed that SLPs were also qualified to diagnose APD; specifically, only 16% of Auds felt that SLPs were qualified to diagnose APD, and more than twice that percentage of SLPs, 36%, held this opinion. This suggests that APD diagnosis is a grey area in which a minority of professionals in each discipline feels that diagnosis is within the purview of SLPs. In reality, however, only 27% of the SLPs who were not dually certified in audiology reported doing AP assessment, and only 36% of these respondents did so independently; thus, only 10% of the total sample reportedly conducts independent AP assessment.

Treatment. SLPs from the current survey (62%) appeared to have more confidence than Auds from the earlier survey (40%) in the qualifications of Auds to provide therapy. In contrast, almost all of the SLPs (99%) and the majority of the Auds (74%) indicated that SLPs were qualified to provide therapy. The data clearly indicate that SLPs play a primary role in remedial therapy from their own perspective and the perspective of Auds. The tendency of Auds to less frequently identify therapy within the realm of audiology could be strictly pragmatic. Emanuel et al. (2011) reported factors that limited the Auds’ ability to provide AP therapy, including lack of training (46% of responses), school district policies (46%), time (28%), individual school policies (26%), and reimbursement (19%).

Clearly, responses to the two surveys indicate that both professions are more likely to identify Auds as APD diagnosticians and SLPs as APD intervention specialists. The intermediate step between diagnosis and intervention, that of making intervention recommendations, was much more likely to be classified by Auds in the earlier survey (Emanuel et al., 2011) as the responsibility of the Aud (81%) compared with the SLP (40%). The audiology survey only asked respondents to indicate their opinion regarding the general category of recommend intervention, whereas the current survey divided the recommendations into three categories. Similar to the earlier study, the majority of SLPs (>85%) in the current study indicated that Auds were qualified to recommend intervention in all three categories; however, the results were dissimilar regarding the SLP’s role. Specifically, the majority of SLPs felt that SLPs were also responsible for making recommendations for remedial treatment (85%), technology-based modifications (64%), and nontechnology-based modifications (93%). Thus, SLPs were far more likely than Auds to indicate that SLPs were qualified to make APD intervention recommendations.

With the majority of both study samples indicating that Auds should be responsible for recommending APD treatment/management, it would be optimal if these recommendations were well received by the SLP, who is the primary professional involved in the provision of therapy. In fact, 40% of the SLPs surveyed were not satisfied with the AP reports that they received from Auds. Thirty-two percent of the sample provided commentary regarding these reports.
Most often, the SLPs indicated that the reports were not individualized (50% of comments) and not practical (21% of comments). According to the SLPs, the Auds’ recommendations were most often for environmental modifications such as FM systems (76%) and preferential seating (84%) and less often for compensatory strategies or remedial therapy (see Figure 3).

In our opinion, a focus on communication between Auds and SLPs may create a better balance between the needs of the student with APD and the capabilities of the school system. For example, a blanket recommendation for an FM system for all children who have been diagnosed with APD represents an approach that is unrealistic given the economic realities in school systems and may serve to cheapen the value of the recommendation in the school system’s view. It is possible that this recommendation is used so commonly because of the well-documented educational benefits of improved signal to noise ratio for children with APD (e.g., Johnston, John, Kreisman, Hall, & Crandell, 2009). If FM systems are recommended as a matter of course for all children with APD, a school system may be less likely to provide the system for children who could most benefit from this accommodation. Therefore, the addition of a recommendation for a trial period with a way to document outcomes would be prudent. This may help to ensure that children who would benefit the most from this accommodation are able to receive it.

Demographically speaking, fewer Auds work in the school system compared with SLPs (ASHA, 2012, 2013), thereby creating a potential for Auds to make a recommendation that may not be practical in the school setting. An examination of the treatment options shown in Figure 3 indicates that a number of items reportedly used by SLPs for APD therapy (e.g., phonemic training, reportedly used by 86% of the SLP respondents) are often used for receptive language therapy (Schuele & Boudreau, 2008), with which Auds may not be familiar. The use of these therapies may be the result of the prevalence of comorbid language delays identified by the SLP, the ability of these therapies to improve the educational and communication impact of APD on the child, or a greater comfort level of the SLP with these techniques.

Modern health care is transitioning to patient-centered and coordinated care regardless of the patient’s point of entry into the system. Professionals from multiple disciplines are encouraged to work together to meet the individual needs of the patient, avoid duplication, and optimize outcomes. This study indicates a need for improvement in the coordination of APD care between the two primary providers: Auds and SLPs.

The traditional medical model of health care emphasizes a focus on the diagnosis of pathology and recommendations for intervention provided by one professional, with the actual intervention then carried out by other professionals. From the audiology surveys, it appears that this model may still be in place for APD care. Although most Auds use input from other professionals, the Aud conducts the assessment and sends recommendations for intervention to the SLP.

This model is problematic in several ways.

- The Aud is seldom the initial point of entry for children with APD; the SLP, working with a multidisciplinary IEP team, is much more likely to be the entry point. Thus, the Aud is a consultant in the middle of an established process.

- The SLP does not have expertise with amplification systems, such as FM systems, which are often part of APD care, and may have limited access to AP assessment tools that require acoustically modified stimuli delivered in a sound-treated room.

- FM systems are seldom covered by insurance and may be the responsibility of the school system, which must view the recommendation amid multiple budgetary requests associated with meeting the needs of children with disabilities.

- Most Auds and SLPs, based on the two surveys, consider the Aud to be responsible for both diagnosing and making individualized treatment recommendations that the SLP will provide for the individual. This means that the Aud is responsible for having the expertise to dictate the follow-up care, when in fact, the surveys indicated that Auds tend to recommend follow-up most often in the area of environmental strategies. This is at odds with the finding that both professionals expect the Aud to provide more extensive, individualized recommendations for therapy.

- A small minority of SLPs conducts diagnostic testing, and some Auds are doing therapy, so the roles of each profession overlap.

We suggest that a system in which (a) Auds are expected to make recommendations across diverse areas of intervention without adequate training; (b) SLPs may not be able to conduct ongoing assessment because of a lack of training, tools, and scope of practice; and (c) efforts are not coordinated, is broken. In our opinion, the solution is to encourage practitioners to enhance patient-centered and coordinated approaches so that the connection between diagnosis and therapy is enhanced. This service
delivery model would be far easier to accomplish in an integrated health center rather than trying to establish a connection between schools and medical centers/private practices; however, it is possible if it is modeled and encouraged. One way we can begin to address this is to enhance interprofessional education and training in graduate programs. If students train to work together in teams with other professionals and learn to expect this model of health care delivery, their exposure to the skills of other professionals and to an expanded view of health care may result, eventually, in a more contemporary system of APD care delivery.

Interprofessional education and training activities require substantial commitment on the part of university programs. Coordinating schedules, recognizing the importance of this training, and obtaining funding for new activities are not easy tasks. Examples of interprofessional activities that have been conducted at our university include (a) an annual college-level case study event, including faculty-facilitated student round-table discussions of a complex clinical case, with each table including nursing, kinesiology, audiology, speech-language pathology, and occupational therapy students; (b) large-scale disaster simulation exercises, including “victim” volunteers from local high schools/community associations and “first responder” students from varied majors within the College of Health Professions (Austin et al., 2014); (c) shared coursework across disciplines, pulled from the existing curriculum, such as courses from our clinician to administrator transition program used as electives in the curriculum for other programs; (d) workforce seminars, specifically, in 2014, approximately 300 College of Health Professions students attended a panel discussion including five local hospital presidents/CEOs on various topics including their desire to hire students with the ability to work in multidisciplinary teams; (e) the WHHAVE (Wellness and Health in Hearing Voice & Ergonomics) project, which is a joint educational and health screening program including audiology, speech-language pathology, and occupational therapy students; (f) the WISH (Wellness in Stroke and Head Injury) program, which is a joint clinical program with speech-language pathology, occupational therapy, and exercise science students; (g) the young cancer survivor program, which is a joint clinical program with exercise science and nursing students; (h) various programs at the Hussman Center for Adults with Autism, including student mentors from various majors who serve as student mentors for the participants in the program; and (i) various support groups that are run jointly by speech-language pathology and occupational therapy students and faculty at the Institute for Well Being (IWB), including sensory-motor groups for young children, the successful pursuits program for adults with disabilities, and social groups for individuals with autism. Other opportunities for interprofessional education and training include journal clubs, online discussion boards, and medical symposia.

Future Research

This is the first study to survey SLPs regarding APD protocols and the connection between Auds’ APD reports and the APD intervention that is provided by SLPs. The response rate was relatively low; however, there were almost 200 responses, which is similar to the sample size of the companion study of Auds that was published in 2011 (Emanuel et al., 2011). Further, the demographics of the SLP sample were similar to those of ASHA members in general, including the percentage of females (95% sample, 94% ASHA), respondents in private practice (19% sample; 18% ASHA), and school-based SLPs (65% sample, 54% ASHA) (ASHA, 2011). Future research in this area should consider a briefer, more targeted survey to increase the response rate and further explore ways in which the connection between Auds and SLPs in APD care can be enhanced so as to develop a more patient-centered and coordinated approach. Possible areas of focus for future surveys include Auds’ and SLPs’ opinions of optimal protocols for patient-centered care in APD.

Summary

The purpose of this survey was to assess SLPs’ opinions related to the screening and assessment of, and intervention for, APD in children and to compare these results with those from a similar survey of Auds (Emanuel et al., 2011). SLPs often conduct APD screening and sometimes conduct APD assessment. Compared with Auds, SLPs were more likely to use (a) classroom observation for screening, (b) tests that did not involve acoustically modified speech for assessment, and (c) therapy-based treatment. According to the SLPs, Auds’ APD reports could be improved, with a focus on individualization and practicality. It is suggested that all APD evaluations and intervention plans involve both Auds and SLPs working together with a focus on patient-centered care. Optimally, all intervention recommendations should be individualized and should be based on the assessment results and case history of each child. Future studies should examine optimal service delivery models, with a focus on patient-centered care in APD assessment and intervention. Graduate programs may be able to address this need in
the future by emphasizing interprofessional education and training for speech-language pathology and audiology students.

ACKNOWLEDGMENTS

The authors would like to thank the Towson University Graduate Student Association and the Department of Audiology, Speech-Language Pathology and Deaf Studies (DFST) for their financial support of this study.

REFERENCES


Contact author: Diana C. Emanuel, Department of Audiology Speech-Language Pathology and Deaf Studies, Towson University, 8000 York Road, Towson, MD 21252-0001. E-mail: demanuel@towson.edu