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Abstract

Clinicians facilitate successful use of Alternative and Augmentative Communication (AAC). The most clinically competent providers, however, address needs that extend beyond technical AAC use to help clients experience full participation. This can only be achieved for all clients by considering individual cultural factors that affect their participation. This article describes how Personal and Environmental Factors of the World Health Organization's (WHO's) International Classification of Functioning, Disability and Health: Children & Youth Version (ICF-CY; *WHO, 2007) encompass how cultural characteristics (e.g., family/ home, school, recreational, social, or spiritual) impact participation. The ICF-CY can provide a structured way for Speech-Language Pathologists to consider culture to maximize children's full participation in activities.*

Introduction

An understanding of how culture works in the context of a child's environmental and personal factors, as well as measurement of outcomes based on activities and participation is integral to the effort to reduce augmentative and alternative communication (AAC) system abandonment (Beukelman & Mirenda, 2013; Johnson, Inglebret, Jones, & Ray, 2006; Lauer, Longenecker-Rust, & Smith, 2006; Threats, 2008). Culture is an important concern because the demographic profile of the United States is changing, thereby affecting clinical practice. The following sections will describe demographics and disability; culture and communication; clinical and cultural competence; the *International Classification of Functioning, Disability and Health: Children & Youth Version* (*ICF-CY;* WHO, 2007); and theoretical support for the practice of accounting for culture when assessing functional participation in activities with AAC. Application of these concepts will be illustrated using a case study of a child from a culturally and linguistically diverse (CLD) background who uses a speech-generating device.

Demographics and Disability

In 2014, 13% of the U.S. population was foreign born and 21% of those above age 5 years spoke a language other than English; with 9% claiming to speak English "less than very well" (U.S. Census Bureau, 2014). Multilingualism and low socioeconomic status (SES) disproportionately overlap with immigrant and racial/ethnic minority status (Garmezy, Masten, & Tellegen, 1984). Further, cumulative risk models indicate that the intersection of certain demographic factors in the same individuals affects development and functioning; leading to poorer language, cognitive, and social development (Burchinal, Roberts, Hooper, & Zeisel, 2000; Garmezy, Masten, & Tellegen, 1984; Toppelberg & Collins, 2010). The negative impact of social risk factors on development

predicts that children of particular cultural backgrounds with multiple social risk factors will be represented in Speech-Language Pathologists' (SLPs') and Audiologists' caseloads.

Culture and Communication

To address culture in relation to communication disorders, we must first clarify the definition of *culture*. Damen (1987) defined *culture* as, "learned and shared human patterns or models for living; day-to-day living patterns. These patterns and models pervade all aspects of human social interaction. Culture is mankind's primary adaptive mechanism" (p. 367). Attention to cultural environmental factors is not important simply because provision of appropriate services for all is socially just; rather, demographic trends in various areas of the country indicate that traditionally "minority" groups will become the majority in the near future (U.S. Census Bureau, 2014).

Cultural Mismatch

Yet, the demographic profile of certified Audiologists and SLPs is not reflective of the rapidly changing population. Of the 173,530 members of the American Speech-Language-Hearing Association (ASHA) certified at the end of 2015, 8% belonged to a racial/ethnic minority group, compared to 28% of the U.S. population (ASHA, 2016). In 2013, 5% met ASHA's definition of bilingual and 58% of those were Spanish-speaking (ASHA, 2014). Thus, only 42% of bilingual providers are covering the remaining non-Spanish languages. Further, 81% percent of the bilingual providers were White (ASHA, 2014); so even when both parties are bilingual, they still may not identify with each other culturally. Because caseloads are increasingly diverse, communication style and expectations of children using AAC will not always match with the interaction style of the mainstream school system (Barbarin, Downer, Odom, & Head, 2010; Tizard & Hughes, 1984). For this reason, clinical competence extends beyond technically accurate service provision to include cultural competence.

According to Jezewski and Sotnik (2005), "cultural brokering" is a systematic approach to bridging the cultural gap between health care providers and patients in order to provide better outcomes. The SLP might use a "cultural broker" from the client's culture who can provide pertinent information, interpret language, or advocate for the client. Combining knowledge of the other culture with clinical skills supports development of the most effective treatment plans (Oxendine, Goode, & Dunne, 2004).

Cultural Considerations in Assessment and Treatment

Cultural considerations span the AAC process from the initial review of a file to establishing long-term outcomes. When assessing morphology, semantic, syntactic, and pragmatic language domains in English, Brown's stages of development and grammar (Brown, 1973) can be used to describe typically developing children. Children with complex communication impairments who use AAC, however, do not always develop language typically, so Brown's descriptions should be used with caution (Helling & Minga, 2014).

As Lund and Light (2006) note, a culturally aware approach is more patient-centered than only measuring outcomes specifically related to the AAC system, such as acquired symbol recognition or use. Yet, this task of symbol and vocabulary choice has cultural ramifications in itself. It is the SLP's job to ensure that items on the AAC system are designed to maximize the ability of the child to learn, function, and participate in activities across settings (Zangari & Van Tatenhove, 2009). For example, a device or picture system should include items particular to the child's home life such as food, toys, and symbols representing holidays or regular events in the child's culture. Further, vocabulary selection in both English and the home language is important because the choice of words can hamper of hinder literacy and language development (Clendon, Sturm, & Cali, 2013). For example, morphological markers and structure words (e.g., auxiliaries, determiners, pronouns) have not traditionally been included on AAC devices, which can negatively affect language and literacy growth for beginning writers in English when their devices contain

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mostly nouns (Lund & Light, 2007; Sutton, Gallagher, Morford, & Shahnaz, 2000). For English, high frequency vocabulary and structure words have been compiled (Clendon & Erickson, 2008) but vocabulary development can differ by word type across languages. In English, for example, nouns are emphasized and are the most frequent type of word in early development, whereas verbs are likely to occur early in Spanish-speaking children (Bornstein et al., 2004). Thus, the clinician must remember that the child is learning two different sets of vocabulary when assessing the growth and trajectory of semantic development (Barac & Bialystok, 2012). Furthermore, very few standardized or norm-referenced assessment tools are valid for use with bilingual people, further complicating the language assessment of CLD children (Hehir et al., 2005).

Knowledge of how both (or multiple) languages work in the child's environment is crucial to the maintenance of bilingual status and culture in the child's home, and can be complicated when multiple languages are involved (Barac & Bialystok, 2012; Sutton, 2008). For this reason, word-level AAC systems are most appropriate for children who are CLD, as phrase structures do not necessarily work the same way across languages.

Socioeconomic status. Children from low SES backgrounds may not have exposure to the same academic vocabulary or books as middle SES families, or the same quantity of vocabulary exposure (Hart & Risley, 2003). So when the clinician evaluates the child's vocabulary, they might consider low SES as a possible reason the child may have a smaller vocabulary, rather than a vocabulary disorder. An accurate evaluation of vocabulary carries over into accurate vocabulary selection for an AAC system.

There are unique learning-related perspectives and values that characterize the different levels of SES. In low SES culture, for instance, children and families might feel powerless and believe that outside, oppressive forces are in control of their wellbeing (Roseberry-McKibbin, 2008). Families of low SES backgrounds are more likely to have difficulty accessing the most appropriate AAC (Assistive Technology Act, 2004; Harris, 2015). This perception of disadvantage based on social class can affect access to treatment and appropriate AAC, and SLPs must understand that not all families will know how to navigate the bureaucratic system of insurance providers, educational administration, and health care. One cannot expect everyone to know to question rules such as prohibiting taking an AAC system home from school (which would be supported by law if the IEP team stipulates that the device should be taken home). Further, all members of immigrant families may not be literate in English. Hence, the clinician should not expect that everyone will be able to write an effective, compelling appeal letter to the insurance company (Harris, 2015; McCord & Soto, 2000). Last, low SES families may not be able to afford a lawyer if due process or arbitration with the school district is not satisfactory for the family. These are areas in which the clinician may need to increase advocacy efforts and health education for the family.

In low SES households, families may prioritize things like food, shelter, and safety over long-term plans (Roseberry-McKibbin, 2008). This may manifest itself as disappointment when progress in treatment is slow, with many incremental, small steps. Many people who are in low SES households do not have a regular day shift or the ability to have only one job. Hence, a family of low SES may not consistently follow through with the suggestion that they learn all of the phases of a PECS system, for example, and use it at home. This lack of time for provision of the highest dose of intervention and support impacts the rate of a child's development and full participation in activities at home, in school, or during recreation. If the child is not yet able to make requests with a picture exchange system or AAC device, this, in turn, may increase challenging behavior due to his or her inability to communicate effectively, adding yet another stressor to the family.

With low SES comes health disparities (Adelman, 2007). The child may not function as well in order to participate in activities because they do not have access to the same level of care that middle SES families might receive. In some cases, access to care includes access to more expensive assistive technology. Yet even with insurance, some families may not be able to afford

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the most effective or efficient device. This is another reason to consider SES as a crucial environmental factor impacting the family. In these cases, the clinician is expected to determine the child's functioning in the low SES setting in order to recommend services that might mitigate some of the burdens brought on by low SES, and modify treatment based on what is possible financially. Although what is more expensive is not always most appropriate, when the client is low SES and an expensive AAC system is needed, this becomes a barrier to participation. If the family is unable to acquire a particular device or the school will not allow the child to bring their device home, the clinician should devise an alternative type of AAC for the home setting, in addition to advocating for the client to receive the most effective AAC system for use in all settings. Maintenance of a high-tech device might be cost prohibitive as well, so careful exploration of options that are sustainable in a low SES household is needed.

While examining cultural effects on functioning, however, remember that individuals in groups are not monolithic in thought and behavior, and membership in some groups can change in response to environmental factors (Lynch & Hanson, 2004; Miles, 2007). For example, the growing income disparity in the United States (Corak, 2013; Fry & Taylor, 2013) makes social class variation within broader racial/ethnic groups important, because low SES is linked to health disparities that can transcend racial groups. The recent economic recession, signified by record numbers of home foreclosures and job losses, found many middle SES European Americans (EA) shifted to the low SES income bracket (Morin & Motel, 2012). This effectively expanded the portion of EAs who could be considered part of a non-mainstream cultural group (i.e., on the basis of economic status). Due to isolation from urban centers, rural, low SES populations are most underrepresented in research samples and receipt of health care services and some low-SES rural regions are entirely comprised of EAs (Burchinal, Vernon-Feagans, Cox, & Key Family Life Project Investigators, 2008). Hence, it is important to appraise cultural differences among EAs that may currently be less recognized.

Conversely, racial/ethnic minorities can be members of middle- and upper-SES groups, requiring SLPs to assess the client's cultural influences in relation to multiple characteristics, rather than making surface-level assumptions. Thus, while the culturally competent clinician will note general tendencies of cultural groups, they must realize that culture can change over time, and that cultural characteristics within groups intersect with cultural characteristics determined by other environmental factors (Threats, 2010).

Age. Age is also a cultural factor that can lead to a potential mismatch between youth and SLPs. When they have access to computers, much of younger people's communication is non-verbal with the use of texting, Instagram, and other social media (Fallon & Katz, 2011). To deal with the loss of the subtleties of face-to-face communication, tools such as emoticons (pictorial representations of a facial expressions using letters, punctuation marks, and numbers) have become common ways to communicate feelings or moods in print and, like languages, these emoticons differ by culture (Gajadhar & Green, 2005; Park, Barash, Fink, & Cha, 2013). Thus, children using AAC not only need to communicate within the family and school cultures, but also within their own often non-verbal youth subculture. The need for clinical competence by way of cultural competence is rooted in the core of our practice (i.e., remediating disorders in language, socialization, and communication) and cultural characteristics that can be manifested in both Personal and Environmental Factors of the *International Classification of Functioning, Disability and Health: Children & Youth Version (ICF-CY;* WHO, 2007).

International Classification of Functioning, Disability, and Health for Children

According to the United Nations Convention on the Rights of the Child (1989), "A mentally or physically disabled child should enjoy a full and decent life in conditions which ensure dignity, promote self-reliance and facilitate the child's active participation in the community" (Article 23(1)).

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Children have traditionally been classified into diagnostic categories of disability and eligibility for educational services (e.g., SES, English language proficiency) using tools such as the *Diagnostic and Statistical Manual of Mental Disorders* (*DSM-5;* American Psychiatric Association, 2013) or the *International Classification of Diseases* (*ICD-10;* Florian et al., 2006; World Health Organization, 2010). A framework to classify how impaired functioning might limit activity and participation in children, however, had not been implemented widely before the *International Classification of Functioning, Disability and Health: Children & Youth Version* (*ICF-CY;* WHO, 2007) was developed. The ICF-CY is different from other classification tools in that it accounts not only for social and psychological characteristics of childhood, but also the trajectory of developmental characteristics. This paper is centered on the ICF-CY Environmental and Personal Factors that serve as a context in which to evaluate social, psychological, and cultural features that influence functioning and, ultimately, participation in daily life.

Components of ICF-CY

The ICF-CY is divided into two sections; Components of Functioning and Disability and Components of Contextual Factors, that can be directly linked to AAC and related clinician practices. The Functioning and Disability component illustrates how the clinician can provide a thorough determination of functioning by both; (a) classifying how the client functions in the Activities and Participation domains and; (b) addressing activity limitations and restrictions of participation. Within the Contextual Factors component of the ICF-CY, Personal Factors represent the child's individual traits besides disability; such as gender, race, age, educational level, or lifestyle. The external Environmental Factors include societal, attitudinal, and physical environments in which the child lives that impact functioning. The clinician should be able to use clients' cultural characteristics to describe Personal Factors that affect functioning and understand how culture is manifested in Environmental Factors such as communication partners and settings.

Dynamic Systems Theory to Support Use of ICF-CY for Cultural Consideration

The idea of interaction among Personal and Environmental Factors represented by cultural characteristics is supported by Dynamic Systems Theory (DST), which is based on the premise that everyone has multiple, complex external systems (e.g., the home, neighborhood, community, school, workplace, and the people who contribute to child developmental processes) that interact with internal systems (e.g., cognitive level, comorbidities, genetics, developmental progression, gender, race/ethnicity; De Bot, Lowie, & Verspoor, 2007; Hwa-Froelich, 2014). Cultural factors can influence; (a) whether there is a stigma of disability; (b) how families accept a disability and; (c) the degree to which the stigma's effects vary within and across cultures (Dyches, Wilder, Sudweeks, Obiakor, & Algozzine, 2004; Westby, 2014). Cultural groups around the world have differing views of disability (Smart, 2001), where some expel the person with a disability from the community; some reluctantly take care of them when convenient; and others revere those with disabilities, treating them with great care (Lukoff, 1972).

Accordingly, family culture(s) may impact AAC acceptance, use, or abandonment. An AAC treatment plan customized to each client with the primary goal of functional communication that enhances participation in daily activities can show the family how capable and intelligent the child may be, thereby reducing social stigma (Helling & Minga, 2014).

Cultural Competence

To make decisions about the best AAC system to implement, a culturally competent clinician will examine characteristics that impact the child's environment such as; (a) family behavioral health; (b) family economic status; (c) family expectations; (d) family roles; and (e) cultural characteristics in the Personal domain such as race/ethnicity and language use/proficiency (Harris, 2015; Helling & Minga, 2014; Huer, 2000; Parette, Chuang, & Huer, 2004; Shanawani, Dame, Schwartz, & Cook-Degan, 2006). Cultural competence is not only an appreciation and respect for cultural differences and self-reflection about personal biases that might affect how one interacts with clients from a different culture (Battle, 2000). It also includes active consideration

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of how communication is affected by varied forms of language acquisition and exposure (e.g., cultural differences in how children play, use language, and communicate (Barbarin et al., 2007; Kaiser et al., 2007), which is, in turn, affected by cultural group membership (Threats, 2010).

Family Influence on Communication

Augmentative and alternative communication will always be an ancillary method of communicating within a culture. Thus, the transmission of culture via language can be disrupted because the client is learning to use the AAC system while trying to blend in with their surrounding language and cultures. Hence, the clinician must ascertain whether or not the people in the child's immediate environment are comfortable with adapting their language customs. The natural "speed" of communication in a language setting might also influence how well the child can use the AAC system in that culture, or how feasible it is for others to adapt their language to the child.

The quality of a child's functioning is dependent upon interactions with the family, where the child's disability affects the family system and vice versa (Florian et al., 2006). Several studies have shown children to be acculturated into society through language socialization with their parents, siblings, and peers before they enter school (Damico & Damico, 1993; Heath, 1983; Ochs, 1988; Sanchez, 1983; Schieffelin, 1990). Caregivers model social behaviors, including forms of interaction based on their own cultural values and beliefs that vary by race/ethnicity and SES. These cultural variables can affect caregiver communication styles and ultimately, children's language use; especially if a child enters school influenced by a culture other than the mainstream, which increases the potential for difficulty socializing in a mainstream educational setting (Chen & Rubin, 2011; Damico & Damico, 1993; Hart & Risley, 1999; Heath, 1983; Hwa-Froelich, 2014; Ochs, 1988; Sanchez, 1983; Schieffelin, 1990; Teichman, & Contreras-Grau, 2006).

Cultural factors have been proven to influence social skills when considering beliefs about age and the role of children in society. In some cultures, children do not always converse with adults directly or ask unsolicited questions, as is commonly accepted in educational systems based on mainstream U.S. customs (Borofsky, 1987; Crago, 1990; Heath, 1982; Ochs, 1988). For example, this age-based communication hierarchy resulted in Native American children responding less to their teachers' queries when compared to EAs (Phillips, 1983). If a child is uncomfortable speaking to adults (e.g., teacher, staff, administrator), this ultimately puts the child at risk for difficulty in learning interactions. This is one example of why the clinically competent clinician contemplates how culture supports and/or hinders full participation in various aspects of daily life (Beukelman, Yorkston, & Reichle, 2000; Parette et al., 2004). Specifically, the clinician should keep in mind that activation of a speech-generating device tends to require the user to initiate communication, which may not match with the child's culture.

This dynamic exchange of external and internal cultural factors manifests itself differently from family to family, and some family cultures that differ from mainstream, Western culture's model have been perceived as deficient (Bywaters, Ali, Fazil, Wallace, & Singh, 2003; Trimble & Fisher, 2006). In addition, while some immigrant families experience cumulative risk factors, they can also carry protective factors such as a high value of education, religion, community, optimism, and dual frame of cultural reference (Fuligni, 2001) which bolsters children's resilience in the face of potential mental difficulties (Toppelberg & Collins, 2010). Thus, when considering family as an environmental factor, the clinician must be aware of any personal biases about how families should interact with the child; and using the ICF-CY Environmental Factors as a framework (rather than the version of a family communication behaviors familiar to the clinician) allows a more objective appraisal of the child's functioning within her or his family unit.

AAC Evaluation Using ICF-CY and Culture

There are multiple components to the AAC selection process, and cognitive abilities, linguistic abilities, and sensory profiles should be accounted for when assessing the client's ability

to access an AAC system. The traditional evaluation process for AAC also requires (a) ascertaining communication capabilities; (b) determination of which symbol system to use; and (c) choosing the device or system (Beukelman & Mirenda, 2013; Rush & Helling, 2013). The Participation Model (Beukelman & Mirenda, 2013) of assessment, which is based on the ICF, however, also can be used to determine the participation needs of communication partners without disabilities, as these are the people with whom the child will be attempting to participate in activities. Next, barriers to the child's participation are identified, and the AAC intervention is designed to diminish those barriers (Helling & Minga, 2014).

The ICF-CY is both a conceptual framework and a classification system (Threats, 2010), yet the global, broad goals of the conceptual framework may not be fully realized in the actual classification system. The use of numbers, by definition, can imply that two people with the same codes and ranking have the same impairment (Reed et al., 2005). However, a goal may not be reached or progress made toward needed goals without a system to track it. In other words, behaviors do need to be assessed, documented; and then any change also assessed and documented (Threats, 2008).

The ICF-CY does not tell a clinician how to assess any given area or code, but it does provide a platform to build an assessment protocol. These would differ from standardized tests, which force the same item on all children, regardless of culture. For example, ICD-CY code b16713, for gestural communication, might be used for children with very different gestural systems across cultures. The children would be rated on their ability to produce the age-appropriate gestures in their culture using the same code; but different target items would be used for these different children. If one culture uses relatively fewer gestures, a smaller amount of gestures might constitute "within normal limits." At the same time, that amount of gestures might be rated quite differently for a child in a culture where gestures are frequently used as a nonverbal way to communicate (Threats, 2010).

In the ICF-CY, Body Function codes start with "B." Body Structure codes start with "S," Activity/Participation codes start with "D," and "Environmental codes start with "E." In the case study below, possible codes are aligned with the given behavior (Threats, 2010). The ICF-CY codes have qualifiers added to the end of the code to denote severity: 4 for complete/profound inability, 3 for severe difficulties, 2 for moderate difficulties, 1 for mild difficulties, and 0 for within normal limits (WHO, 2007). Thus, if a child in the example was at b16713.3 for gestures at the beginning of intervention and b16713.1 by the end of the treatment period, this shows a documented improvement.

For Environmental Factors, the qualifiers include a range of both facilitators and barriers, with +4 being a complete/comprehensive facilitator and, at the opposite end, 4 being a severe/complete barrier (WHO, 2007). If an SLP attempted to change a client's tentative attitude toward AAC use, one would document the current degree of barrier in order to make more methodical, informed decisions about how to convert the barrier to some degree of being a facilitator. The chapters of environmental codes include ones covering support, attitudes, and governmental/societal supports. As with other components of the ICF-CY, the assignment of these codes would be influenced by the cultural norms of children's environments.

The following case will illustrate the use of this part of the ICF-CY (along with other selected codes; See Table 1) with respect to AAC for children, while considering culture, Activities and Participation, Personal Factors, and Environmental Factors. The assignments of codes to behaviors are the author's choices and research on linking of behaviors to ICF codes is ongoing. See Cieza et al., (2005) for more discussion on linking behaviors and assessments to ICF codes.

Case Study

Petar is a minimally verbal, 5-year-old boy with a diagnosis (per the DSM-5) of severe autism with a language delay and mild cognitive impairment. Petar did not babble much and had said

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Table 1. ICF-CY Life Areas Represented by Petar's Characteristics

Code	Descriptions	Specific to Petar	Cultural Factors affecting AAC use for Activities/Participation
Body Functions			
b126	Temperament & Personality Functions	b1260 Extraversion	Keep in mind that a Personal Factor for Petar may be that he is introverted, like all of his family members are.
b167	Mental Functions of Language	b16710 Expression of Spoken Language	Encourage family to provide & accept spoken language in either English or Bosnian.
		b16712 Expression of Signed Language	Help Petar learn "baby sign" language in English or find a cultural broker who knows if "baby sign" is used in Bosnian homes.
		b16711 Expression of Written Language	
		b16713 Expression of Gestural Language	Help Petar form gestures appropriate for American and Bosnian homes.
Activities & Participation			
d177	Making Decisions		Islamic home may not require independent choice making.
d133	Acquiring Language	d1330 Acquiring Single Words or Meaningful Symbols	Will need Latin and Arabic options for Bosnian and English.
		d134 Acquiring a Different Language	Will need Bosnian or English options.
d145	Learning to Write	d1450 Acquiring skills to use writing implements	Will need both Bosnian and English options if using keyboard.
		d1400 Acquiring skills to recognize symbols including figures, icons, characters, alphabet letters & words	Will need both Latin and Arabic symbols for Bosnian and English symbol recognition.
d163	Thinking	d1630 Pretending	Use cultural broker to learn stories, characters, cartoons, common in Bosnian homes.
d166	Reading	d1660 Using general skills & strategies of the reading process	Will need both Bosnian and English symbols on device.
		d1661 Comprehending Written Language	Will need reading partner fluent in Bosnian to ask/answer written comprehension questions.
d170	Writing	d1700 Using general skills & strategies of writing process	Will need knowledge of both Bosnian and English narrative and storytelling styles.
		d1701 Using grammatical & mechanical conventions in written compositions	Will need knowledge of both Bosnian and English grammar rules.

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d250	Managing One's Own Behavior	d2502 Approaching Persons or Situations	Tell family that a child initiating interactions with an adult will help Petar in school and social settings when he needs help.
		d2501 Responding to Demands	Will need options in both Bosnian and English to respond with, "OK, yes, no, in a minute, etc."
d330	Speaking		Will need both Bosnian & English words on device and encourage family to model words verbally as they use the device.
d335	Producing Nonverbal Messages	d3350 Producing Body Language	Gestures and eye contact may be different in Bosnian home so use cultural broker to learn of any differences.
d350	Conversation	d3500 Starting a Conversation	Tell family that a child initiating conversation with an adult will help Petar in school and social settings when he needs help.
		d3501 Sustaining a Conversation	
		d3505 Conversing With One Person	
		d3504 Conversing with Many People	
d3608	Using Communication Devices & Techniques	d3608 Using Communication Devices & Techniques, otherwise specified	Will need both Bosnian and English words and symbols on the device.
		d3600 Using Telecommunication Devices	
d710	Basic Interpersonal Interactions	d71040 Initiating Social Interactions	Tell family that a child initiating conversation with an adult will help Petar in school & social settings when he needs help.
d720	Complex Interpersonal Interactions	d7200 Forming Relationships	
d815	Preschool Education	d8151 Maintaining Preschool Educational Programme	
d760	Family Relationships	d7600 Parent Child Relationships	Good emotional support from parents.
d880	Engagement in Play	d8803 Shared cooperative play	Learn people games (peek-a-boo, tickle), stories, and toys common in Bosnian homes.
d910	Community Life	d9100 Informal Associations	Encourage continued social activities with relatives and classmates' parties.
		d9102 Ceremonies	Does not attend mosque services.
		d9103 Informal Community Life	Coach parents on teaching appropriate communication to replace challenging behavior in public.
d920	Recreation & Leisure	d9202 Arts & Culture	Have Petar attend mosque events for holidays.

		d9200 Play	Encourage parents to take Petar to playground with device and plan target words ahead of time ("push" for swing, or "again").
Environmental Factors			
e125	Products & Technology for Communication	e1251 Assistive Products & Technology for Communication	Have SGD for home and emphasize the importance of using it across settings, even if parents know what he wants through other means.
e130	Products & Technology for Education		Use similar picture systems like visual schedules at home if Petar will only use PECS at school with SLP and facilitator.
e410	Individual Attitudes of Individual Family		Immediate family attitudes are optimal so encourage family to explain the purpose of the SGD to extended family.
e415	Individual Attitudes of Extended Family		Extended family attitudes are not optimal, so explain the purpose of the SGD, that it does not hinder verbal language, and that Petar's learning academic subjects along with his classmates will be easier now that he can communicate.
e445	Individual Attitudes of Strangers		Suggest the family to try to ignore strangers if they seem critical.
e460	Societal Attitudes		Describe different attitudes toward disability found in American culture.
e465	Social Norms, Practices & Ideologies		Even if children are not expected to talk as much unprompted, tell the parents that this will be encouraged at school to improve Petar's functional language.
e580	Health services, systems & policies	e5800 Health Services	Inform family of how SLP services work in an outpatient clinical setting and what other services he may be eligible for (OT, PT).
		e5802 Health Policies	Assist family in understanding policies pertaining to medical insurance coverage for SGD and speech-language pathology services.
e585	Education & training services, systems & policies	e5853 Special Education & Training Services	Inform staff of any barriers and supports for treatment in Petar's life.
		e5854 Special Education & Training Systems	Because there is no special education in Islamic school, inform teachers about what to expect with Petar and how to use his SGD.
		e5855 Special Education & Training Policies	Assist family in understanding policies pertaining to educational services and accommodations Petar should receive.

Note. Codes From World Health Organization. (2007). ICF-CY, International Classification of Functioning, Disability, and Health: Children & Youth version. Geneva: World Health Organization.

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"dada" and "mama" when he was 1 year old, but appeared to have regressed to zero words at age 2 (d330, d331). This is when his parents became concerned that Petar was not talking as much as his older siblings. His vision (d110) and hearing (d115) are within normal limits, but he did not imitate actions or words (d130). Based on the ADOS-2 (Autism Diagnostic Observation Schedule), which is a standard set of activities to elicit communicative and social responses, Petar was found to have social responses that were restricted in range, and this was likely, in part, a result of an impairment in expressive language. Specifically, Petar had a severe impairment in expressive spoken (b16710.3), sign (b16712.3), and gestural (b16713.3) language; and a moderate impairment in expressive written language (b16711.2). His moderate impairment in sustaining (b1400.2), shifting (b1401.2), and dividing (b1402.2) attention (b140.2), as well as severe impairment in sharing attention (b1403.3) may also have contributed to his social communication profile, making his ability to regulate social interactions difficult. Last, his moderate impairment in receptive spoken (b16700.2), sign (b16702.2), and gestural (b16703.2) language; and moderate impairment in receptive written language (b16701.2) affected his ability to understand language in order to form socially appropriate, relevant responses to communication bids from the examiner. For example, he used the wooden replicas of a birthday party appropriately (d1313), but he struggled to participate in imaginary play (d1314) and to respond to the reciprocal play skills the examiner prompted. He also had difficulty following another person's gaze or joint attention gesture (e.g., distal gaze or point).

The Social Responsiveness Scale-Parent Report/Teacher Report is a rating scale to measure social responsiveness, awareness, cognition, communication, and motivation. Petar scored a t-score of 80 (normal range is 59 or less, mild to moderate is 60–75), which corroborates the social skills deficits captured in the ADOS-2. The father reported that Petar does not seem to be on the same wavelength as others (b160), walking into people who are talking (b1600), walking through others' play activities and materials, and wandering aimlessly from one activity to another (b1400). The daycare teacher, however, was not as concerned about social responsiveness, as evidenced by the majority of her ratings indicating that he struggled in social areas only sometimes. However, she also said that he was not on the same wavelength as others and did not attempt to engage with other children (b1403).

Petar did not demonstrate atypical interest in particular parts of toys (e.g., oscillating parts, wheels) but will be fixated on the same toy for extended periods of time, repeating the same action with the toy. When considering Emotional Functions, Petar had moderate impairment in appropriateness (b1520.2), range (b1522.2), and regulation of emotion (b1521.2), as demonstrated by flat affect in response to typically happy or sad situations, and over-reaction (manifested in tantrums) to minor problems.

Petar had problems with fine motor skills, such as holding a pencil correctly (d1450), stringing beads, or writing (d145). Petar also had an unusual way of moving his hands. For instance, he put his hand underneath his chin while vocalizing a sustained /i/ sound. These moderate and severe impairments at the Body Functions level affected Petar's activities and participation in play (d880) and education at the daycare (d820).

Participation in Education

Petar attends an English-speaking community daycare 5 days a week, where he is expected to participate in circle time, do fine motor activities like crafts, play outside on the playground and on the water slide in the summer, and sit at a table with three other children to learn academic subjects (letter recognition, Handwriting Without Tears, counting, shapes, and colors; d1450, d1451, d1500, d1501). The daycare setting is where he demonstrates a moderate impairment in carrying out a daily routine (d230) where following (d2300.2), managing (d2301.2), completing (d2302.2) daily routines along with his classmates can be difficult. As he progresses through school, Petar will increasingly be expected to manage unexpected changes in routines (d2304), and manage his own time (d2305) in order to adapt to time demands (d2306); thus, any similarities or differences in temporal concepts between school culture and home culture should be identified.

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Cultural differences in time concepts have been well established (Roseberry-McKibbin, 2008) so specific AAC supports can be implemented (adding a visual depiction of a clock or timer to a device) to remind Petar that he has 20 minutes to finish his math problems and that if he is not yet done, this is not a big problem because he can finish them at home.

Visual supports like social stories help teach appropriate behaviors and emotional regulation when he has difficulty managing time or following a routine, but they may need to be translated for Petar's mother to read, and/or the transparency of the symbols and pictures (Huer, 2000) should be verified with the father or a cultural broker to ensure that they are useful to Petar's family. The translated social stories should also be added to the device in order to increase use of the device.

Part of Petar's difficulty maintaining routines can be attributed to multiple transitions to different rooms throughout the day, resulting in moderate impairments in managing his own behavior (d250), as evidenced by throwing himself onto the floor and screaming for 10–15 minutes, three times a day (moderate impairment accepting novelty; d2500.2). Petar also likes to climb on classroom furniture to get a desired item like paint or an iPad from shelves, and his response runs counter to his teachers' demands that he not climb furniture (d2501).

Another impairment impacting participation in school (and other settings) is his moderate impairment in the ability to make decisions, where he has difficulty making choices among options or tasks (d177.3). Making choices will grow more complex (e.g., choosing from a field of three or more items; choosing items/activities that are not visually present) and he will need this skill in different settings. Petar's parents want him to eventually attend Islamic school on the weekends, which will be a new environment culturally different from his mainstream daycare experience. Thus, if Petar's home and Islamic school environment is very supportive to where choices are made for him, or his wants are known/anticipated (Armstrong & Ager, 2005), making choices may need to be a goal initiated by his daycare teachers and SLP to ensure that he practices the skill of independently initiating requests and choices. This goal should also be explicitly explained to the family, in the event that having Petar request unprompted things does not match with their normal way of children interacting with adults in their culture. His daycare teacher's goals therefore included expansion of functional expressive communication, making requests, and self-advocacy. A long-term goal would be for him to initiate and maintain conversation.

Several environmental factors contribute to the degree to which Petar can participate at daycare. Further, the environmental factor of a daycare setting is a system that interacts with the environmental factor of family culture, and this dynamic interaction can result in changes to his family's view of disability. For instance, an environmental factor at daycare would be the fact that he is in class with typical children half of the day and a special education class the rest of the day. The ability to see and hear typical models of social behavior can impact Petar's sense of inclusion and promote attempts to initiate social interaction with peers. This inclusive environmental factor might affect the personal factor of being labeled "disabled" such that being included with other children could lessen the stigma for both Petar and his family (e410), which is another environmental factor. Because he does not have an apparent cognitive impairment, this environmental factor of an inclusive classroom can also positively impact his education by allowing him to learn at the same pace as others his age, thereby reducing the stigma of his disability for his family and extended family.

Petar's parents intend for him to attend Islamic school on the weekends once he enters Kindergarten. Islamic schools are designed to maintain Muslim identity and preserve the beliefs and values of the culture (Syed, 2000). Their Quran is translated into Bosnian, which uses Latin letters, and the family speaks the Stokavian dialect of Bosnian (Accredited Language Services, 2016). Because of Petar's bilingual potential in both oral and written form, the clinician must find an AAC system that will grow with Petar to meet his educational needs and accommodate

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two languages. This is an illustration of DST, where the system of family language affects Petar's personal systems of expressive communication and development of language.

Family Disability Beliefs

In Islam, there are various beliefs about what disability is, including a way to test faith in God, an act of God, a blessing to be able to help the disabled person reach a higher level after death, or punishment for misdeeds. According to some, the Quran states that society should show sympathy for those who are disabled, not stigmatize them (Bazna & Hatab, 2005; Hasnain, Shaikh, & Shanawani, 2008). As with all religions, there can be different interpretations of the same text. Thus, knowledge of someone's faith does not always predict their behaviors or reactions in stressful situations such as having a child with a severe disability. In Bosnia, people who are sick are encouraged to express how they are feeling, and relatives are encouraged to give moral and physical support (Pascale, Manderson, Nikles, Reidpath, & Sauvarin, 2016). Dynamic Systems Theory can explain how, once again, these positive suggestions that stem from systems of religious doctrine or cultural mores do not necessarily translate to how people actually respond to those who are disabled in the day-to-day system of secular culture. Rather, parents of a disabled child may feel shame and isolate themselves from the rest of the community, resulting in their not taking advantage of social services and therapy. Bosnian parents tend to have a serious fear of illness and may not believe a disabling condition can be managed without medications (e465). Hence, psychotherapy, group therapy, or occupational therapy may be rebuffed (Pascale et al., 2016), demonstrating how the system of cultural beliefs about health care can affect the system of compliance with healthcare recommendations from a different culture.

This incongruence between cultural beliefs of how people with disabilities should be regarded versus how they are actually treated in society shows that the way concepts of disability are put into practice depends on the individual and the surrounding culture at multiple levels. For instance, Armstrong and Ager (2005) identified an emphasis on collective responsibility for caring for those with disabilities in Afghanistan, but, from the perspective of the researchers, this resulted in programs that served only to support people with disabilities, rather than to facilitate their ability to live independently (Armstrong & Ager, 2005; Turmusani, 2004). This is another reason why SLPs must approach the treatment plan with knowledge of how treatment goals in their own culture may not match those of another culture. In Petar's case, the SLP may decide that a speech-generating device would allow him to be most independent when communicating, whereas the family may prefer a picture exchange system in which a communication partner (or two, in some phases) must be present in order for the child to communicate by giving the cards to the listener.

In Muslim families of lower educational levels, disability labels are not as important as how the person is able to function, rendering the label meaningless at times, which contrasts with the Western view of diagnosis (Hasnain et al., 2008). As medical or educational diagnoses are required to receive certain services in the United States (Florian et al., 2006), the clinician may need to explain the need for a diagnosis if; (a) the client is from a culture that tends not to label disabilities; or (b) the client's country of origin does not consider what is deemed a disability in the United States to be a disability (Ypinazar & Margolis, 2006). Yet, there still exists a continuum of experiences with disability within the Muslim culture where some face compounded disadvantages (e.g., bigotry, lower SES) in the United States, whereas other Muslims may not have the same struggles. Nevertheless, Muslims along the entire range of experiences with disability can thrive in environments where their culture and religion are relied upon for support (Hasnain et al., 2008; Miles, 2007; Toppelberg & Collins, 2010).

Family Religion

According to Islamic law, those who have a clinical diagnosis of insanity do not have to adhere to religious rituals (Saabid, 2016). When considering physical disabilities, the idea that Islam values "heart" more can encourage clients to judge their worth by inner characteristics instead of outer, physical traits.

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Petar's family prays the Salät five times a day and attends Salaat-ul-Jumma at the mosque every Friday. Women and children, however, are not required to attend on Friday, and congregants are to be quiet during the khutbah (sermon). Thus, use of AAC at the mosque should not be a high priority until Petar is an adult (d330, d3350, d3351). The social status of a religion is also important. Although 40% of the population in Bosnia is Muslim (Countries and Their Cultures, 2016), Islam is an even smaller minority religion in the United States, although it is the fastest growing religion in the world. Based on the phenotype of a White person in the United States, many Bosnian Muslims would be considered White, unlike those of North African, Asian, or Arab descent. Hence, they may not experience as much discrimination if they have no outward signs of being Muslim. Petar's mother does wear a hijab, while his father is able to navigate through the community without others knowing at first sight that he is Muslim. It is when Petar's parents speak or pray that others who would prejudge might have a negative view of them. This personal factor of the family becomes an environmental factor for Petar where, if the family prefers to be as inconspicuous as possible, they may be hesitant to have Petar use an AAC device everywhere, so as not to draw additional attention (e410, e415).

Family Language

Both Bosnian and English are spoken in the home, but Petar's mother understands but does not speak English. As Petar's mother will be the primary caregiver interacting with the SLP during therapy, an interpreter and/or homework strategies written in Bosnian may be needed if the clinician is unable to determine whether or not the mother understands when the SLP speaks in English. As Petar is minimally verbal, the clinician can learn some target words in Bosnian to use throughout the treatment sessions as a model for the mother to also implement at home (d134) and encourage maintenance of both Bosnian and English.

Petar's device or picture system should include traditional Bosnian food, as his family does not eat non-Bosnian food regularly. For instance, the clinician should find icons that resemble foods like grilled meat, *Bosanski Ionac* (cabbage stew), *Kefir,* (yogurt drink) and re-label the icons with the Bosnian words; or find photographs of the foods. The few American foods he eats, such as Goldfish ® crackers could be printed using whatever term they use in the home. For observance of Ramadan, a sunrise and sunset icon could also be programmed to begin to teach him about fasting.

Overall, each family member should use the language most comfortable for them, and any AAC system should have both Bosnian and English words (d1330). Having the word-level system will give Petar flexibility in generating phrases and sentences because the device will not be bound to phrases in one syntactic system; thereby enhancing his participation in both languages and cultural settings (d330, d335, d350). These syntactic organizational skills will also carry over into education by supporting cognitive processing (d161, d163), reading (d1660), and word retrieval (Helling & Minga, 2014).

Petar's parents reported that he understands simple commands but cannot vocalize, sign, or draw what he wants or tell them that he is hurt, indicating a severe impairment in expressive language (d330.3, d335.3). When communication is frustrating for Petar, he becomes withdrawn. He does have some nonverbal strengths, however, where he knows to take someone's hand and lead them to something he wants; he reaches for things; and he will bring objects to others to regulate their behavior (e.g., get them to open bubbles). Of the few words he had in infancy, some were in Bosnian (e.g., *somun*), and some were in English (e.g., *car, go*). Petar's parents said that it is generally rare to find him socializing with anyone, including his family (d3503.4).

Family SES

Research has shown differences in communication by SES, which would be an environmental factor. The environmental factor of SES is a system that interacts with the factor of family language (the mother's language barrier) within Petar's system of family; resulting in an increased chance of health disparities that cause difficulty accessing or maintaining AAC services (e5800; Adelman, 2007; Hernandez, 1997; Hernandez, Denton, & Macartney, 2007).

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Educational status is another component of SES and overseas qualifications and skills may not be recognized in the United States, which can lead to frustration, reduced earning capacity, diminished social status, and other problems (Pascale et al., 2016). Petar's father works two jobs and is enrolled as a college student, taking prerequisites for applying to graduate school. Thus, he is very busy and not able to spend as much time with Petar as the mother. The family was unaware of Early Intervention, (e5800) and Petar's pediatrician, who is often in the position to refer patients for services (e5802), suspected that he was just a late talker until age 4;7, when she finally referred Petar to a university clinic for an evaluation. This delay in services, sometimes along with sub-standard public education (e5851, e5854), is frequent among families from low SES homes, and, in this way, the environmental factor of low SES can negatively affect Personal Factors for generations (McLeod & Threats, 2008).

This case exemplifies different issues one may encounter during assessment and intervention planning for children who use AAC. Petar demonstrated developmental delays in language, symbolic play (d1630), and social skills, and, due, in part, to the challenges in treating minimally verbal people, these clients are frequently disqualified from intervention research (Walton & Ingersoll, 2013). This dearth of functionally nonverbal participants in research, combined with the limited inclusion of those from CLD populations, presents a gap in the knowledge base of communicative disorders treatment. Dynamic Systems Theory supports the notion that the severity of Petar's communication impairment along with personal and environmental factors that affect his case make AAC planning more complicated, but the ICF-CY provides a structure to help the clinician account for how different systems affect Petar's functioning. The ICF-CY, coupled with application of cultural and clinical competence, is a step forward in the concerted effort to administer appropriate AAC methods that can have a positive impact on Petar's participation in various activities.

Conclusion

Dynamic systems in the environment interact with personal factors, thereby impacting AAC users' experiences and functioning in various ways. This makes appropriate selection of the AAC system challenging, regardless of the user's demographic background, but the assessment can be customized to each client (Helling & Minga, 2014). Therefore, it is best to collaborate with the client when evaluating the influence cultural characteristics have on communicative functioning in relation to activities most important to the client (Threats, 2010). Because the goal of an AAC assessment is to identify communication strategies that will work with various communication partners, situations, and settings, appraisal of the child's environmental and personal factors is a crucial component of the evaluation process.

There are tools such as the Assistive Technology Device Predisposition Assessment (ATDPA; Scherer, Sax, Vanbiervliet, Cushman, & Scherer, 2005) that can assist in this process of evaluating the interactions the environment, client, and features of the AAC system; and the ATDPA was designed to correspond with the International Classification of Functioning, Disability and Health (ICF; World Health Organization, 2001). Thus, in order to reduce the chance of AAC system abandonment (Johnson et al., 2006; Lauer et al., 2006), consideration of how culture operates in the context of Environmental and Personal Factors, as well as measuring outcomes based on Activities and Participation will be integral to the effort to enable the child to fully participate in society.

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