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Viewpoint

A Synthesis of Relevant Literature on the Development of Emotional Competence: Implications for Design of Augmentative and Alternative Communication Systems

Ji Young Na,[a] Krista Wilkinson,[b] Meredith Karny,[b] Sarah Blackstone,[c] and Cynthia Stifter[b]

Purpose: *Emotional competence* refers to the ability to identify, respond to, and manage one's own and others' emotions. Emotional competence is critical to many functional outcomes, including making and maintaining friends, academic success, and community integration. There appears to be a link between the development of language and the development of emotional competence in children who use speech. Little information is available about these issues in children who rely on augmentative and alternative communication (AAC). In this article, we consider how AAC systems can be designed to support communication about emotions and the development of emotional competence.
Method: Because limited research exists on communication about emotions in a context of aided AAC, theory and research from other fields (e.g., psychology, linguistics, child development) is reviewed to identify key features of emotional competence and their possible implications for AAC design and intervention.
Results: The reviewed literature indicated that the research and clinical attention to emotional competence in children with disabilities is encouraging. However, the ideas have not been considered specifically in the context of aided AAC. On the basis of the reviewed literature, we offer practical suggestions for system design and AAC use for communication about emotions with children who have significant disabilities. Three key elements of discussing emotions (i.e., emotion name, reason, and solution) are suggested for inclusion in order to provide these children with opportunities for a full range of discussion about emotions.
Conclusions: We argue that supporting communication about emotions is as important for children who use AAC as it is for children who are learning speech. This article offers a means to integrate information from other fields for the purpose of enriching AAC supports.

Augmentative and alternative communication (AAC) provides many children with disabilities much-needed access to effective expressive and receptive means of communication (Beukelman & Mirenda, 2013). The number of children who can benefit from AAC is substantial; for example, Binger and Light (2006) suggested that 12% of preschool children who attend special education programs in Pennsylvania require AAC. Children with significant disabilities, including multiple disabilities, are in need of the greatest supports and interventions (Johnston, Reichle, & Evans, 2004), and researchers have shown that such children benefit from AAC interventions (K. N. Cole, Coggins, & Vanderstoep, 1999; K. N. Cole, Mills, & Kelley, 1994; Romski & Sevcik, 1996).

The effectiveness of AAC systems and related interventions likely depends at least in part on the effectiveness of their design (Light, Page, Curran, & Pitkin, 2007; Wilkinson & Jagaroo, 2004; Wilkinson, Light, & Drager, 2012). AAC systems that are optimally designed are more likely to promote success, whereas those that are poorly designed may hinder outcomes. Johnson, Inglebret, Jones, and Ray (2006) surveyed 275 speech-language pathologists about factors related to success with AAC. Participants reported that the fit of the system to the needs and skills of the individuals and partners was of critical importance, including considerations of vocabulary needs (Adamson, Romski, Deffebach, & Sevcik, 1992; Wilkinson, Romski,

[a]Communication Sciences and Disorders Program, The Kansas State University, Manhattan
[b]The Pennsylvania State University, State College
[c]Augmentative Communication Inc. and AAC-RERC, Monterey, CA
Correspondence to Ji Young Na: jiyoungna2015@gmail.com

Editor: Joe Reichle
Associate Editor: Mary Ann Romski
Received August 28, 2014
Revision received March 24, 2015
Accepted January 25, 2016
DOI: 10.1044/2016_AJSLP-14-0124

Disclosure: *The authors have declared that no competing interests existed at the time of publication.*

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& Sevcik, 1994) and partner training (Kent-Walsh & McNaughton, 2005). AAC systems and related interventions need to be designed in ways that support desired outcomes, including language, and cognitive, social, emotional, and academic development.

In this article, we argue in favor of the potential benefits of designing AAC systems to support communication about emotions and offer some ideas about potential system designs that would enable such communication. In the first half of the article we explore theory from other fields, particularly psychology, in which there is an extensive literature concerning the role of the development of emotional competence in social, academic, and developmental outcomes. We consider the potential relation of language to the development of specific components of emotional competence (i.e., the use of emotion vocabulary) and discuss one particular behavior of interest: private speech. In the second half of the article we consider how these other bodies of knowledge might be relevant to AAC system design. We review the few studies that explored how emotions are represented on AAC systems and how such representations are perceived and understood by children. We conclude with a clinical practice framework for constructing AAC systems in ways that can help support individuals who use AAC to communicate emotions and develop emotional competence.

Emotional Competence in Children With Typical Development

Emotional competence refers to the emotion-related abilities an individual needs to deal with a changing environment (Saarni, 1999). This concept involves far more than just regulation of emotions or management of challenging behavior during a moment of heightened emotional arousal. Saarni (1999) specified eight skills of emotional competence: (1) awareness of one's emotional state, (2) ability to discern others' emotions, (3) ability to use the expression terms of emotion, (4) capacity for empathic and sympathetic involvement, (5) ability to discriminate inner and outer emotional states, (6) capacity for adaptive coping with emotions, (7) emotional communication within relationships, and (8) capacity for emotional self-efficacy.

A number of authors have discussed the importance of emotional competence in functional outcomes for children (e.g., Buckley, Storino, & Saarni, 2003; Trentacosta & Izard, 2007). One of the key outcomes of developing emotional competence is promoting readiness for learning. For instance, a child who is either underaroused (e.g., sleepy, daydreaming) or overaroused (e.g., crying, laughing) is not in an optimal state to take in or process information. Emotional competence also contributes to the development of social relationships, both with single individuals (friendships) and with groups (peer-group entry). Academic and vocational success may in part depend on acquisition of self-regulation skills that enable the child to minimize vulnerability to distraction from other children in the classroom and development of context-appropriate behaviors that enable the child to adjust his or her behavior to the partner or task demands. Self-regulatory skills include attentional regulation, behavior regulation, and emotion regulation (Aro, Laakso, Määttä, Tolvanen, & Poikkeus, 2014). In turn, these skills lead to self-determination and self-advocacy, enhancing independence during transitions to adulthood.

We adopt Saarni's (1999) conceptualization of sequenced development of emotional competence via acquisition of component skills as our guiding framework for examining emotional competence. Saarni (1999) emphasized that there are child-internal (i.e., physical and cognitive) and external (i.e., sociocultural) factors in relation to the development of emotional competence. From this perspective, we can extrapolate that both child-internal and contextual factors will influence development of the skills. In the current article we focus specifically on language development—in particular, access to means to communicate about emotions—as a factor significantly influencing development of skills in children who use AAC. A treatment of the potential contextual or cultural influences on this process is critical but is beyond the scope of this single article. Therefore, we suggest some key directions in this article for cultural considerations at each step, but with the understanding that our propositions require direct empirical testing to verify or refute them and that a systematic analysis of cross-cultural research is needed to better inform future efforts on this topic.

Proposed Relations of Communication and Language and Emotional Competence

We argue in the previous section that emotional competence is an important contributor to a number of valued social, academic, and developmental outcomes. In the current section, we consider evidence that suggests that the development of emotional competence—and, in particular, several of its subskills—is linked to communication about emotions by children and their partners. If communication plays a role in the development of emotional competence and/or its subskills, then provision of access to such communication would be an important aspect of AAC design. This consideration is of particular relevance in individuals who rely primarily on AAC rather than speech for conventional means of communication but who are not yet accessing literacy or other generative symbol systems (i.e., semantic compaction systems) because such individuals are restricted to the vocabulary selected for or programmed into their AAC systems. We suggest that individuals who use AAC will be able to successfully discuss their own or others' emotions only when appropriately designed and programmed emotion language (e.g., emotion symbol) is made available on their AAC systems.

Although the exact nature of the relationship between communication, language, and certain subskills of emotional competence and language is still being explored, there appear to be important links (Beck, Kumschick, Eid, &

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Klann-Delius, 2011; Saarni, 1999). Many of the links between language and emotional competence rely on causal research designs (e.g., correlational studies, viewpoint articles), yet these studies consistently point to an important relationship. The support comes from two types of sources: (a) observation of a relationship between the emergence of language and emotional skills in children with typical development and (b) correlations between difficulties in each of these domains. We begin this section by summarizing the evidence that may illustrate this relationship. We then turn to one particular mechanism by which language and emotional competences might be linked—private speech—and discuss why this link has particular relevance to individuals who use AAC.

Correlations of Language and Emotional Competence in Children With Typical Development

A number of studies have reported that advances in language skills are correlated with advances in measures of emotional competence. Roben, Cole, and Armstrong (2013) investigated the longitudinal relation between language skills and emotion regulation in 120 children ranging in age from 18 to 48 months. Mean length of utterance was calculated from a spontaneous speech sample obtained during 10-min observations of family interaction. In addition, the MacArthur Communication Development Inventory–Words and Gestures (MCDI; Fenson et al., 1993) was administered at 18 months of age, Clinical Evaluation of Language Fundamentals–Third Edition (Semel, Wiig, & Secord, 1995) was given at 36 months of age, and the Test of Language Development–Primary: Third Edition (Newcomer & Hammill, 1997) was completed at 48 months of age. Emotional skills were assessed by observing and coding children's anger expression and regulatory strategies during an 8-min wait period that was described as "boring." Children with more advanced language skills demonstrated fewer expressions of anger. Also noted was that growth in language development over time corresponded with a decrease in expressions of anger and an increase in use of regulatory strategies.

Vallotton and Ayoub (2011) examined the relation between language and self-regulation in toddlers. They hypothesized that spoken vocabulary and overall talkativeness would influence the development of toddlers' self-regulation. Longitudinal data were collected from 120 toddlers at 14, 24, and 36 months of age during home visits. The observer rated the participants' behavioral ability using the Bayley Behavior Rating Scale (Bayley, 1993), a 5-point scale that measures the ability to self-regulate. Two language skills—spoken vocabulary and talkativeness—were assessed by video-recording 10-min dyadic play episodes during mother–child interactions. Children's spoken vocabulary was measured as the number of unique words spoken (e.g., *dog* and *dogs* are not unique vocabulary). Their talkativeness was measured by total number of word tokens (e.g., *dog* and *dogs* are two different word tokens). Results showed that the young toddlers' spoken vocabulary and talkativeness contributed to their self-regulation. When the full maximum likelihood method of estimation was used, both the children's talkativeness and their vocabulary showed a positive correlation with self-regulation abilities. When those two factors were contrasted, the unique vocabulary size was a better predictor than talkativeness.

Kubicek and Emde (2012) examined 15- to 30-month-old toddlers' emotion expression and language in a longitudinal fashion. Earlier and later talkers were identified on the basis of the Infant Form of the MCDI (Fenson et al., 1993). They identified 39 earlier talkers (top 25% on the MCDI production norms) and 38 later talkers (bottom 25% on the MCDI). Those 77 toddlers were recruited at 13 months of age. Experimental measurements were conducted at 15, 21, and 30 months of age. In addition to measures of general temperament and functioning, specific measures of language included mean length of utterance (adapted from Brown, 1973) and the MCDI (Fenson et al., 1993). Emotional expressions were assessed using activities designed to elicit emotions (e.g., a puppet game and a modified peek-a-boo game for episodes of joy and pleasure). A variety of modes of expressions were coded (e.g., speech, facial expressions, vocalizations, motor acts). Earlier talkers were found to be more likely to express positive emotions such as joy and pleasure than later talkers when both frequency and intensity of expression were measured. Later talkers were more likely to express negative emotions such as fear and anger.

Beck et al. (2011) examined the relation between language competence and emotional competence in 210 children between the ages of 7 and 9 years in Berlin, Germany. Language competence was indexed through tasks that measured various types of expressive language, including the picture book *A Boy, a Dog, a Frog, and a Friend* (Mayer & Mayer, 1971), the German adaptation of the Peabody Picture Vocabulary Test (Dunn & Dunn, 2004), and the German standardized Reading Comprehension Test for Grades 1–6 (Lenhard & Schneider, 2006). Emotional competence was indexed through tasks that measured recognition and expression of basic and mixed emotions, including the Kusche Affective Interview–Revised (Kusche, Greenberg, & Beilke, 1988) and a computer-based test of facial recognition (Beck et al., 2011). A close relation emerged between language competence and emotional competence.

It seems quite likely that the influences under discussion is mediated, directly or indirectly, by cultural expectations of appropriate means for responding to and discussing emotions. For instance, P. M. Cole, Bruschi, and Tamang (2002) examined how distinct groups of children in the United States and Nepal interpreted a scenario in which a father spilled tea on the child's homework. Children were asked to describe both their likely emotional response to the spill and the reason for that response. Children in the United States were more likely to report feeling anger because they attributed the ruined homework to their father's mistake. In contrast, children in Nepal were more likely to feel shame because they blamed themselves for the situation. Any effort to support communication about emotions

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needs to be sensitive to and incorporate cultural values and expectations of this sort, and noncausal research designs as they relate to AAC are desperately needed.

All of these studies indicate correlation between the emergence of skills of emotional competence (e.g., emotion regulation) and language (e.g., expressive vocabulary) in children who are developing typically. However, these studies report only causal research designs. There is an urgent need to examine more closely the exact nature of the relationship both at a causal level (perhaps via intervention studies) and in children who have disabilities, including those who use AAC.

Correlations of Language and Emotional Competence in Children With Disabilities

There have been only studies that report causal research designs on the relation of communication or language and emotional competence in children who use AAC. However, the co-occurrence of language delay or disability and difficulties with emotional competence or its component skills underscores the likelihood that such a relationship exists. Indeed, many studies have reported the co-occurrence of language delay or disability and challenges in emotional skills in children. For example, a recent longitudinal study investigated the correlation between Finnish toddlers' language and communication skills and their later self-regulatory skills (Aro et al., 2014). Fifty-seven children with language delay were compared with 128 children with typical language development in terms of their self-regulation skills at kindergarten age on the basis of the measurement results from scales used to assess executive and regulative skills, including emotion-regulation skills, such as the Emotion Internalizing and Externalizing Symptoms scales of the Social Skills Rating Scale (Gresham & Elliott, 1990). Kindergarteners with delay in toddler-age language development demonstrated poorer self-regulation skills than children with typical language development. Moreover, some forms of intellectual or developmental disability and psychiatric symptomatology correlate highly with the presence of challenging behaviors in children and adults with limited language skills (Dykens, Hodapp, & Finucane, 2000; Emerson, 2003; Emerson, Robertson, & Wood, 2005; Molteno, Molteno, Finchilescu, & Dawes, 2001; Petry & Maes, 2006; Wishart, Cebula, Willis, & Pitcairn, 2007).

To date, some of the only direct consideration of the relation of the skills of emotional competence and language in children with disabilities has focused on children and adolescents with specific language impairment (SLI) or autism spectrum disorders (ASD). First, children with SLI may be especially likely to experience difficulty with social interactions and are considered at heightened risk for emotional or psychiatric difficulties (e.g., see data and discussions in Durkin & Conti-Ramsden, 2010; Fujiki, Brinton, & Clarke, 2002; St. Clair, Pickles, Durkin, & Conti-Ramsden, 2011). Fujiki et al. (2002) examined the relationship between emotion-regulation skills and language development by comparing 41 children with SLI and 41 children with typical development. Teachers rated children with SLI (particularly the boys) as lower on some—but not all—aspects of emotion competence on questions concerning emotion regulation. Fujiki, Spackman, Brinton, and Hall (2004) conducted a follow-up study with 43 children with SLI and 43 children with typical development that further investigated the impact of these children's emotion regulation on social behaviors. Teachers reported that children with SLI were more socially reticent than their peers with typical development. Almost half the variance in reticence measures was explained by a combination of difficulties related to emotion regulation (e.g., disruptive behaviors, frustration) and language challenges. This suggests that subskills of emotional competence are not simply universally restricted in children with weak language difficulties but rather that some aspects are more selectively affected than others. With regards to ASD, the relation of the skills of emotional competence and language has been addressed from a clinical standpoint in the Social Competence, Emotional, Regulation, Transactional Support model of assessment and intervention (Prizant, Wetherby, Rubin, & Laurent, 2003). In this model, children with ASD show difficulties with arousal and, consequently, emotion regulation and present with a distinctive emotional profile (Carter, Davis, Klin, & Volkmar, 2005; Prizant et al., 2003). There is a growing evidence base for the effectiveness of the approaches to enhancing language skills (e.g., verbal emotion expression) related to emotional competence in children with ASD.

On the basis of these findings, we may speculate that there is a relationship between children's communication or language skills and subskills of emotional competence. The exact nature of the relationship and its directionality (i.e., which influences which, or whether the influence is bidirectional) remain to be determined. Moreover, although the research and clinical attention to emotional competence in children with disabilities are encouraging, the ideas have not been considered specifically in the context of aided AAC. We feel it is critical to examine issues related to communication about emotions specifically within the context of AAC interventions. Applications of the ideas presented here as they relate to unique features of different etiological profiles will require specific and direct future research attention. Moreover, as noted earlier, this effort will need to be informed by sensitivity to potential cultural issues that might influence the selection of vocabulary and strategies for discussing emotions.

Private Speech: A Specific Mechanism Linking Language and Emotional Competence

Language learning takes place in social contexts, and many scholars have argued that early language learning is driven by children's communicative intentions to share their feelings and thoughts (Bloom, 2000, as cited in Beck et al., 2011). Theories of sociocultural development such as that proposed by Vygotsky (1986) argue that higher order psychological functions have social origins and that children's cognitive, communication, and language development is

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influenced by the internalization of skills acquired during joint activities with others (Vygotsky, 1986; Winsler, Carlton, & Barry, 2000). Such a theoretical framework places great importance on communication language as a sociocultural tool for thought and self-regulation and for the development of competencies, including emotional competencies.

One example of how language may be a tool of this sort is found in private speech. Private speech is described as speech that is addressed to either the self or no one in particular and is different from social speech in that it is not directed toward a communication partner (e.g., Berk, 1986). Among other functions, private speech guides cognitive performance and regulates social behavior and has been argued to be important in developing social skills, behavior regulation, goal-directed behavior, and academics (Frauenglass & Diaz, 1985; Winsler, De León, Wallace, Carlton, & Willson-Quayle, 2003; Winsler & Naglieri, 2003). With regards to the development of emotional competence, private speech may be critical for supporting the development of Saarni's (1999) proposed skills because it can help children learn to identify and label emotions (Skills 1–5) and may function as a tool for planning, guiding, and monitoring problem-solving activity (Skills 6–8).

Vygotsky (1986) originally argued that the frequency of children's audible private speech follows an inverted-U pattern in relation to age, peaking during the preschool years and decreasing in the elementary school years as it goes "underground," becoming what is called *covert* or *inner speech* (Frauenglass & Diaz, 1985). Vygotsky (1986) also suggested a positive relationship between the amount of private speech and task difficulty (K. R. Harris, 1990), a proposition that has been upheld in later studies. For instance, Winsler and Naglieri (2003) and Winsler et al. (2000; for a literature review on this topic, also see P. M. Cole, Armstrong, & Pemberton, 2010) studied private speech in various cohorts of preschoolers (3- to 4-year-olds) as well as school-age children and adolescents. Children's verbal strategies moved from overt speech to partially covert speech to fully covert speech with age. In addition, the frequency of overt private speech increased as the difficulty of a goal-directed task increased and decreased as the child became better at the task over time or with practice. Children who used a higher proportion of whispers and inaudible mutterings during the problem-solving task were rated by parents and teachers as having better social skills and fewer behavior problems than children whose private speech was less internalized. High proportions of covert private speech were also associated with increased positive affect in the classroom. It appears that as private speech becomes covert, or internal, the internal monologue can help a child deal with difficult situations and help regulate emotions at all ages, especially during difficult tasks.

For a child whose oral speech is limited and who relies on AAC, there are likely limited opportunities to engage in either overt or covert private speech unless the AAC system is structured to allow for it. Because one of the functions of private speech appears to relate to self-regulation, including independent regulation of one's emotions, it may be critical to design AAC systems to allow for this important developmental function. We return to this issue in the later section on practical strategies for supporting communication about emotions in individuals who use AAC.

Existing Research on Aided AAC and Communication About Emotion in Children

Blackstone and Wilkins (2009) were among the first scholars to argue that children who require AAC are at risk for delayed development of emotional competence due to factors intrinsic to the child as well as challenges imposed by AAC systems, the context, and task demands. Factors intrinsic to the child might include (a) difficulty communicating using language; (b) difficulty expressing emotions because of physical, motor, or cognitive challenges; and (c) difficulty interacting with people and the environment. Extrinsic factors include (a) partners' difficulty interpreting gestures and/or facial expression, (b) partners' low awareness of the need to address emotional development, (c) myths about AAC and users of AAC, and (d) technology limitations.

Blackstone and Wilkins (2009) further pointed out that limited access to symbols or words throughout the day that depict a range of emotions across contexts is a barrier that restricts the development of emotional competence, putting other development areas at risk. They noted that many speech-generating devices lack features such as inflection, loudness, and pitch that underlie emotional expression. They emphasized that AAC systems should provide not only a large number of appropriate emotion symbols, no matter how they are represented, but also a full range of emotion-related communication tools. For example, they suggested that the vocabulary in AAC systems should not be restricted to labeling but rather should provide interpersonal functions (e.g., "I am there if you need me"), descriptive functions (e.g., "I feel terrible"), and self-regulation functions ("I need a minute, I'm thinking"). Blackstone and Wilkins (2009) also mentioned that children with complex communication needs (CCN) need to learn to use emotion symbols and the related messages in their AAC systems in a culturally appropriate way.

Sources of Evidence Concerning System Design to Support Communication About Emotion

There is very limited research on how AAC systems might best support communication about emotions in children who use AAC. The few studies that have examined graphical representations for emotions have been conducted largely with individuals without disabilities. Even less information is available on whether common symbol sets support communication about emotion. Thus, the literature is sparse concerning how to represent emotion vocabulary using AAC systems.

Some clinical materials that address emotion and that might be used as AAC by children are now available on the Internet, including emotion thermometers, emotion pages,

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and social stories (e.g., http://www.pinterest.com/elizharp/aacat-emotionshurtworry/; http://www.speechandlanguagekids.com/calming-children-self-calming-strategies/). However, to our knowledge, there is no actual empirical base of research that shows how readily these materials are adopted by children who use AAC. This is an important gap because assumptions about the general effectiveness of such materials are as yet untested. For instance, although the function of an analog thermometer is familiar to most adults, it seems unlikely that most children have ever encountered one. If so, what is a fairly transparent icon to adults may be quite arbitrary to most children. Likewise, although social stories have proliferated, many of them focus on behavioral management (e.g., how to behave when angry) and/or how to engage in daily routines (e.g., brushing one's teeth). A recent qualitative analysis of 63 social stories housed in a clearinghouse website found that 43 (68.3%) contained an emotion label; of those, only 32 (50.7%) discussed emotion beyond a simple label (Hobbs, 2014). Therefore, it is important to evaluate sources of relevant research that might inform an effort to support communication about emotion in individuals who use AAC.

One source of evidence that concerns the graphical symbols used to represent emotions provides some information about AAC emotion symbols currently in use. Visser, Alant, and Harty (2008) examined the ability of 26 South African children with typical development to recognize the meaning of different graphic symbols representing four emotions. They investigated how 4-year-old English-speaking children identify emotion symbols in line drawings such as Picture Communication Symbols (Mayer-Johnson, 1981), PICSYMS (Carlson, 1985), and Makaton (Grove & Walker, 1990). Symbols from each set were selected for each of four target emotions (i.e., happy, afraid, sad, and angry); thus, 16 emotion symbols were used. The major findings demonstrated that children recognized emotion symbols for *happy* with 96% to 100% accuracy; identification of the emotion symbols for *angry* (85%), *afraid* (73%–77%), and *sad* (69%–77%) was less accurate. A recent follow-up study examined how 5-year-old children ($N = 90$) who used one of the two different indigenous languages (i.e., Afrikaans and Sepedi) recognized those 16 emotion symbols (DeKlerk, Dada, & Alant, 2014). Both language groups chose more target symbols for a positive emotion (happy) than they did for negative emotions (angry, afraid, or sad). This result was comparable with Visser et al.'s (2008) findings.

Wilkinson and Snell (2011) examined how background color and spatial arrangement affected the speed and accuracy of preschool-age children without disabilities in locating eight target emotions: happy, angry, sad, surprised, afraid/fearful, loving, bored, and silly. Children were asked to match digital photographs that depicted each emotion with its associated Picture Communication Symbols symbol from the array of eight symbols. The main goal of the study was to examine not the emotion content itself but rather the effect of background color and arrangement. However, the authors also provided a basic analysis of the overall accuracy and error patterns across the emotion symbols irrespective of the color or spatial cues. This analysis demonstrated that children recognized the cardinal positive emotions *loving* and *happy* with the highest (84%) accuracy and the cardinal negative emotions *sad* and *angry* with lowest accuracy (76%).

These findings are consistent with research on emotion recognition in children and adults (Egger et al., 2011; Ekman & Friesen, 2003; Gross & Ballif, 1991; Huang et al., 2009). Indeed, studies examining infants' recognition of facial expressions of emotion reveal that within the first year, infants can discriminate among facial expressions of emotion as well as between different intensities of emotion (de Haan, Nelson, Gunnar, & Tout, 1998). Studies of preschool children asked to identify emotion as expressed from both static images and dynamic video-based presentations indicate that emotion recognition increases with age. In general, expressions of happiness are recognized earlier and are more easily recognized than expressions of fear and surprise (Herba & Phillips, 2004, for a review; Widen & Russell, 2003). The ability to detect intensity appears to also vary with age (Gao & Maurer, 2009; Stifter & Fox, 1990). It appears that these abilities might be affected by developmental and behavioral disorders (e.g., autism; Rump, Giovannelli, Minshew, & Strauss, 2009). If these results from children who are developing typically (i.e., more accurate recognition of expressions of positive emotions) are also true with children who use AAC systems, designing symbols for negative emotions should be more careful.

Potential Contributions of Speech Comprehension to Conversations About Emotion

In addition to verbal speech about emotions, any communication about emotions involves a rich mix of multimodal sources of information, including gesture, posture (body language), tone of voice, and other prosodic factors. Yet a child's ability to understand spoken input is a critical factor in designing systems to promote conversation about emotion and, in turn, emotional competencies. Therefore, if clinicians seek to offer children who use AAC access to conventional symbols for discussing emotions, the role of comprehension—of speech and of the symbols—is a necessary consideration.

Sevcik (2006) reviewed longitudinal data in support of the argument that extant speech comprehension plays an important role in the developmental trajectory of acquisition and use of AAC systems. All individuals, regardless of comprehension level, benefit from AAC. The presence of extant speech comprehension, however, was associated with different patterns of AAC learning and achievement in children with a range of developmental levels. Sevcik (2006) and Sevcik and Romski (2005) suggested that skills in receptive language are not just a means to measure outcomes but rather should be exploited as a potential teaching tool because existing receptive skills can be a building block for intervention targets no matter what the initial starting level might be.

Level of comprehension is therefore a key consideration in developing systems to support communication about

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emotions. On the basis of the recommendations from Sevcik (2006) and Sevcik and Romski (2005), comprehension level should never be considered as an eligibility criterion for such intervention. Rather, the processes of intervention would need to be tailored either to support the development of comprehension via AAC symbols (for children who do not yet understand speech and thus have a more limited foundation) or to build the AAC system from the existing foundation of speech comprehension. Further research that examines ways to target interventions on the basis of extant comprehension is critical.

Moving Forward: Supporting Communication About Emotions in AAC

As reviewed in the previous section, the theoretical frameworks of emotional competence in children with typical development (Saarni, 1999), together with Vygotsky's (1986) theory of socially supported development, suggest that many factors likely contribute to the development of emotional competence in children, including those who use AAC. A child's language skills, comprehension level, cultural background, family dynamics, education, temperament, personal history, community, religion, and so forth contribute to a child's development of the skills needed for emotional competence. How these factors influence the development of emotional competence in children who use AAC is an area that desperately needs direct attention. In addition, it will be critical to delineate how cultural differences might affect research and clinical decision making and to develop tools for assessing how such cultural variations might be assessed and integrated into culturally sensitive intervention practices.

To begin to identify possible strategies in supporting the development of culturally appropriate communication about emotion in children who use AAC, we propose three practical steps derived from the theoretical and empirical frameworks we have discussed. Several considerations must be kept in mind as we move forward. First, the ideas we generate are not intended to be used as behavior management strategies during episodes of heightened emotion. Rather, these ideas are meant to help adults offer children a means to think and talk about emotion using their AAC systems. These discussions should therefore occur outside moments of heightened emotional arousal. Communication partners should provide models and scaffolds for children who use AAC to support their emotional development, just as partners of children who speak offer models and input. Second, partners should not speak on behalf of these children. Rather, the emphasis should be on partner modeling and providing access to emotion-related content for children who use AAC. Third, it is important to develop AAC systems that are culturally appropriate because culture is essential to emotional communications. Emotions are culturally grounded, and people with different cultural backgrounds recognize and express their emotions in various ways (Ekman et al., 1987). Therefore, consideration of emotion in the design of AAC systems must incorporate information about the child and the family's individual and cultural preferences. Last, at the current time these ideas require direct evaluation at an empirical level because none have yet been tested. Our goal is to raise awareness of the issues and encourage clinical service providers and academic researchers to take action.

Step 1: Providing and Modeling Labels for a Variety of Emotions

The first step in supporting communication about emotions in children who use AAC is to provide a range of diverse emotion-related vocabulary, both for the child's own use and for modeling by the partner. This step derives directly from Saarni's (1999) framework, which identified the skills of learning to identify and label one's own emotions as well as emotions of others (Skills 1–3) as critical steps in all children's development of emotional competence. This proposition underscores the importance of vocabulary selection because it is necessary to have the means to initiate discussions about how people (the child and his or her partners) may be feeling. Which emotions are selected for inclusion will likely depend on the child and family's individual and cultural preferences. Some emotions (e.g., happy) are more universally recognized across cultural and language communities (Chae, 2011). Selecting symbols and how to represent them, however, requires working closely with families to learn about their traditions and cultural values in order to identify culturally appropriate intervention strategies. Several studies have emphasized that graphic symbols in AAC systems should be selected in a culturally appropriate way (e.g., Bornman & Bryen, 2013; Blake Huer, 2000; Lloyd, Fuller, & Arvidson, 1997). Clinicians need to ensure that the key elements (e.g., emotion symbol) of emotional expression are culturally appropriate in AAC systems.

Inclusion of appropriate vocabulary is also a means to promote children's opportunity to engage in private speech via the AAC system. Because one function of private speech is to promote self-regulation of behavior and emotion, providing children a means to engage in private speech via their AAC system may be critical in promoting these same functions. Without the vocabulary on the AAC system, children with limited speech have no means to engage in this potentially important process. Because overt self-talk precedes covert self-talk in typical development, we can hypothesize that AAC systems need to provide a means for children to engage in both overt and covert private speech, which in turn will help them begin to identify and respond to emotions independently.

Providing emotion symbols on an AAC display is not likely to enable the child to learn to identify/label emotions or engage in private speech unless modeling becomes a key component of AAC interventions (e.g., Johnson et al., 2006). Modeling plays a role in establishing pragmatic and semantic functions (cf. Wilkinson & Hennig, 2007) and in teaching children to use symbol combinations (Binger, Kent-Walsh, Berens, Del Campo, & Rivera, 2008). A variety

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of evidence-based AAC interventions rely on modeling, including Aided Language Stimulation (M. D. Harris & Reichle, 2004), Aided Language Modeling (e.g., Drager et al., 2006), and the System for Augmenting Language (Romski & Sevcik, 1996). Modeling the use of emotion labels (e.g., *happy*, *sad*) to describe the child's or one's own emotions is key to children identifying and labeling their own emotions and the emotions of others (Giddan, Bade, Rickenberg, & Ryley, 1995). Last, modeling by a social partner is consistent with the emotional competence theories put forth as well as social communicative development theory (Saarni, 1999; Vygotsky, 1986).

People often communicate emotion through tone of voice, gesture, and facial expression. These nonverbal behaviors supplement and support linguistic expression in children who speak as well as in those who use aided symbols or signs. Together, these multimodal strategies enable children to develop and internalize language that enables them to communicate about their emotions. These are particularly critical supplementary sources of information for children who have limited comprehension of speech. Thus, partners who model using emotion labels for children who use AAC should use their speech, nonverbal expressions, and the child's AAC system (e.g., saying, "You're feeling sad," making a sad face, pointing to the "sad" symbol). Because these children may not be able to say *sad*, they need communication partners who are not only saying "She's feeling sad" but also modeling the use of the child's symbol array ("sad" symbol) while providing nonverbal supplements using facial expression, tone of voice, and so on. To help children label the emotions of other people, partners should provide a similar type of modeling procedure.

Step 2: Validating and Discussing Emotions

Labeling one's own and others' emotions is an important first step, but it does not reflect the entirety of communication's potential contributions to the skills needed for emotional competence. Saarni (1999) additionally identified the development of empathic and sympathetic involvement, adaptive coping with emotions, and emotional communication within relationships (Steps 4, 6, and 7) as important skills in the progression to emotional competence. Children gradually learn to identify many different emotions and characteristics of emotion, such as the reasons underlying emotions, differences in intensity, and specific cultural and contextual responses people in their communities have to different emotions. For instance, imagine that a child who is doing a puzzle becomes frustrated and throws the puzzle across the room. A caregiver might begin by saying, "You look like you're angry" (labeling the emotion). The next step is to offer the child an opportunity to discuss their emotional response or manage it. Caregivers might discuss the reason for the emotion ("You're frustrated because a piece is missing") or the intensity of the emotion ("You seem really frustrated by that"). This can be done during the experience of the event (which may be less effective if the child is agitated) and can be discussed later (as a reflection on the event) or in other contexts—for example, discussing how a character feels in a storybook ("Dora is frustrated that Swiper took her map") or an event that happened to another child on the playground ("Alex was very frustrated when he had to wait for the swing").

Again, the role of the social partner in helping to scaffold and model these discussions is critical. For children who use speech, the adult's input in the spoken mode is adequate. For children who use AAC, the adult partners must model using the aided symbols on the child's AAC system. According to Vygotsky's (1986) framework, as children experience this modeling and scaffolding over time, they will begin to internalize concepts that relate to emotions they experience themselves and observe in others and to learn vocabulary that enables them to label, think about, and talk about these emotions.

Working with families and other stakeholders is critical in selecting these connected statements that reflect cultural and familial values. We illustrate in earlier sections just a few ways in which cultural differences might emerge in response to emotional situations (P. M. Cole et al., 2002). The cultural background of the person who uses AAC should be considered not only in the stage of providing and modeling labels for a variety of emotions but also in validating and discussing emotions. Furthermore, future research is desperately needed to develop a means to assess individual family and cultural approaches to conversations about emotions and how those might inform construction of AAC displays.

Step 3: Communicating About Appropriate Responses to Emotions

The third step in supporting communication about emotions reflects Saarni's (1999) final proposed skills in the development of emotional competence—that is, promoting capacity for adaptive coping with emotions, emotional communication within relationships, and the capacity for emotional self-efficacy (steps 6–8). This involves ensuring that the AAC system allows for the child to reflect on and communicate about different possible responses to emotions. Returning to the example of the child who threw the puzzle, when a child engages in a behavior such as throwing something, caregivers often impose a consequence, such as a time-out period or removal of the puzzle (although responses to such behaviors may vary widely among cultural groups). The adult may talk spontaneously about possible alternatives to the child's "throwing" behavior. Again, for children who use AAC systems, the discussion of these possible alternatives must include using the child's AAC system. For example, if a caregiver says "You can ask me for help instead of throwing it" but does not use the child's system to point to symbols ("ask," "help," "please"), then the child has no model for how to ask for help nor a means to engage in private speech about that strategy. AAC displays therefore need to contain vocabulary that enables children to reflect on and communicate (to themselves via private speech or to others) about strategies for regulating

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emotion. A well-designed AAC system might provide a menu of icons that includes "Take deep breaths," "Hug teddy bear," "Ask for help," and so forth that could be modeled by the adult and, ultimately, used independently by the child.

Appropriate responses to emotions can vary depending on an individual's cultural background. The example described earlier from P. M. Cole et al. (2002) revealed how children in the United States and Nepal took different actions in the same emotional situation (i.e., their father spilled tea on their homework). Children in the United States said that they would like to talk to their fathers about the situation, whereas children in Nepal chose not to discuss it with their fathers. Thus, it is important to provide culturally appropriate strategies in AAC systems that children can use to communicate about their responses to emotions.

Putting It Together: A Practical Example of How These Steps Might Work

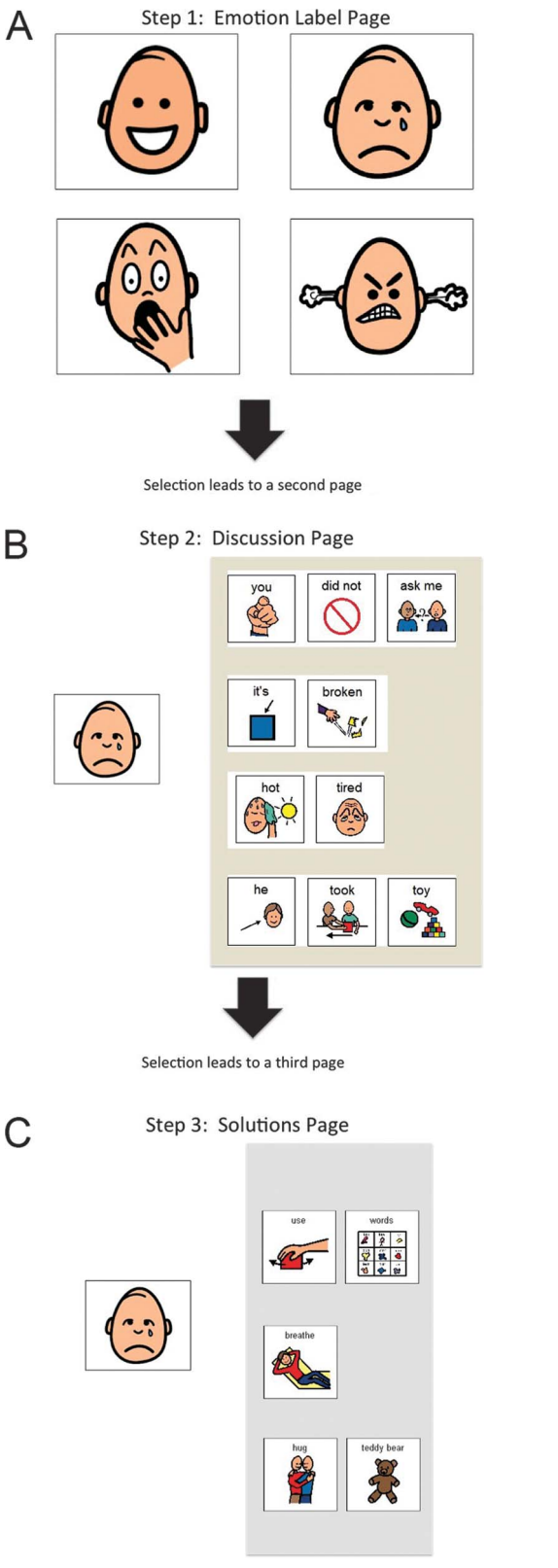
As noted at the outset of this section, the strategies we propose are not intended to be used during periods of heightened emotional arousal. They are more likely to be successful if they are used throughout the day and offer the child opportunities to label and discuss their own emotions and the emotions of others. These discussions might include personal day-to-day experiences as well as discussions about characters in a book, movie, or video or on television. As an example, while reading a book about Dora the Explorer, caregivers might ask "How does Dora feel when Swiper steals her stuff?" to initiate a discussion.

Symbols need not all be presented together on a single page. For example, the system might comprise dynamic or static display pages that are linked according to the three steps outlined above; an example is illustrated in Figure 1. In panel A, the child and caregiver have a page of possible emotion symbols to select from. Each symbol represents a label for a specific emotion but also serves as a navigation tool. Thus, selecting a symbol (e.g., "sad") activates a message (e.g., the spoken word *sad*) and navigates to a second page, where the selected symbol is presented once more along with a variety of *because* statements. As shown in panel B, this page validates the emotion label and prompts a discussion about the reasons for feeling sad. Panel C in Figure 1 illustrates a possible third page, which contains strategies that delineate different ways of handling the situation. In this stepwise fashion, the labels for emotions are elaborated to include important discussions of cause and solutions. It is important to think carefully about selecting the content of such messages so that they support the development of emotional competence in culturally appropriate ways.

Summary

In this article we have sought to raise awareness of relationships that exist between language and the development of components of emotional competence. We have

Figure 1. Three linked pages for communicating about emotions in augmentative and alternative communication.



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highlighted some key elements of language that might support children's emerging independence in identifying and managing their emotions and understanding the emotions of others. We have argued that current AAC systems and interventions that support children who use AAC need to incorporate appropriate vocabulary and the use of modeling strategies and scaffolding to support the labeling of emotions as well as discussion about emotions and appropriate responses to emotions. We have provided a theoretical framework to help support practical solutions because we feel it is critically important to learn more about how children with disabilities currently discuss emotion and how to support their development of emotional competence by respecting family and cultural differences and using appropriate tools and strategies. These ideas are in urgent need of examination at the empirical level. Although our proposals are based on evidence from other fields, that evidence largely is based on research with children who use speech and who do not have intellectual or developmental disabilities. It will be essential to determine how the ideas proposed here operate within clinical environments and how to refine them further.

Acknowledgments

This research project is funded in part by U.S. Department of Education Grant H325D110008. Parts of this project were presented at the 2012 and 2014 International Society for Augmentative and Alternative Communication Conferences and the 2013 Annual Convention of the American Speech-Language-Hearing Association. The authors thank Dale Epstein, Gabriela Rangel, Jennifer J. Thistle, Jacob Feldman, and Pamela Cole for their suggestions and assistance throughout the development of this article as well as the P2C (Pathways to Competence), a research mentoring group run by the Child Study Center of the Pennsylvania State University.

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