

Stephen Nowicki and Marshall Duke

15 Accuracy in interpreting nonverbal cues

Abstract: In the present chapter we describe some of the major conceptual and methodological issues inherent in defining receptive accuracy. We point out that researchers often apply the term “accuracy” to a variety of different indices of accuracy without noting the potential differences. In an attempt to clarify the possible conceptual meanings of receptive accuracy we present a framework, first introduced by Minskoff, that suggests that there are at least four major types of accuracy reflecting less to more complexity: discriminative, semantic, utilitarian, and relational. Using the definitions we attempted to classify different tests that have been used to measure receptive accuracy with a special emphasis on the Diagnostic Analysis of Nonverbal Accuracy. We noted that results of past research tended to be most often reported as single scores for facial expressions. We suggested that more might be gained if researchers focused on a broader range of nonverbal modalities and reported patterns of accuracy scores both within and among modalities.

Keywords: receptive accuracy, discrimination, semantic, utilitarian and relational accuracy, pattern analysis, nonverbal communication

Steve Martin, the well known entertainer/comedian, began one of his monologues by saying that he had just finished writing a book entitled “How to make a million dollars and be happy” and he felt sure it would be a best seller. It begins, Martin says, with the sentence “Make a million dollars,” while the rest of the book is about how to spend it to be happy!

If we followed the Steve Martin formula we might have entitled our chapter something like “Define receptive nonverbal accuracy and see how it affects every aspect of life.” The first sentence of our chapter could be “Make a definition of accuracy that everyone accepts,” and the rest of the chapter would describe how we use that definition to study all aspects of people’s personal, social, and business lives. The truth is, as will be seen, that making a million dollars may be easier than arriving at an acceptable definition of receptive nonverbal accuracy!

We know that “accuracy” demands some sort of agreed upon definition that provides criteria that determine whether judgments are correct or incorrect. We also know that most nonverbal research usually includes facial expressions, postures/gestures, proxemics, and vocalics.

The fact that there are a number of nonverbal modalities presents additional problems for defining accuracy. For one thing, we need to know whether the modalities are independent and orthogonal from one another or do they converge

in delivering a communicative message (Fridlund, Ekman, and Oster 1987). The answer to this question has implications for whether the definition of accuracy is similar across modalities or will have to change from one modality to the next. For example, while it may be easy to argue for using the identification of specific emotions as an “accuracy” criterion in faces, it is more difficult to apply it to gestures or personal space.

There has been a recent upsurge of interest into some of what Elfenbein et al. (2010) have referred to as “the intractable questions” surrounding the association between individual differences in accuracy of emotional expression and accuracy of emotional recognition. While this upsurge is a sign that these questions continue to be interesting and important, there may be more than one way to view the source of their intractability. To be sure, as Elfenbein et al. note, there have been vast improvements in technology and methodologies since the “spark of interest during the mid 1960’s to mid 1980’s” and the questions can and should be revisited using these new advances. However, it is also the case that the search for the answer to the questions concerning the association between expressive and receptive accuracy may have been, as Elfenbein and Eisenkraft (2010) have suggested, “more or less abandoned in light of conflicting empirical findings...” However, the lack of research might reflect as much a problem of memory as one of waning interest. In particular, there seems to have been a disconnection between the conceptual foundations of the earlier stages of research on nonverbal accuracy and the more recent work in the area. This disconnect appears to be reflected in the emergence of what Pedhazur and Schmelkin (1991) have termed a “jingle fallacy” in which two variables that are different from one another are called the same thing. In fact, upon a long-view examination of the literature on accuracy, we have come to believe that the word “accuracy” may have fallen prey to the jingle fallacy. This is to say that, although a multitude of theoreticians, educators, and researchers have used the term for decades, they may have forgotten or not paid attention to the fact that it has a variety of meanings. This variety of meanings, we propose, has become one of the main sources of conceptual and empirical disagreements in the field of nonverbal language research. It could be that many of the conflicts about definition, measurement, and development are likely based simply on one researcher’s “accuracy” being different from another researcher’s “accuracy.” Our goal in this chapter, then is to examine the very notion of accuracy itself and in so doing try to clarify the various meanings of the word both theoretically and empirically. Further, we will attempt to apply a multiplistic definition of accuracy which we believe maps onto the variety of tacks researchers have taken in the study of nonverbal accuracy. Finally, through a deeper examination of one form of accuracy, we hope to demonstrate a way in which seeing accuracy as a plural word can help to elucidate some of the ongoing conflicts in the literature.

1 Accuracy is a plural word

In an influential pair of articles in the *Journal of Learning Disabilities*, Esther Minskoff (1980a, 1980b) proposed a conceptualization of an approach to teaching nonverbal communication skills that provided an intriguing resolution to our modern problem of the definition of accuracy. Minskoff argued that there were four steps necessary for the effective use of nonverbal information in a social context. First, a child needed to be able to *discriminate* nonverbal cues. This meant that he or she needed simply to know that one facial expression was different from another. Second, the child needed to understand the *social meanings* of cues like facial expressions, such that a lowered eyes and a turned down mouth meant sadness. Third, these meaningful cues needed to be used by the child in an effort to make sense of *social interactions*, such as a boy realizing that a smile from a young lady meant that she might be open to a friendly relationship-opening: “Hi!” Finally, the child should be able to demonstrate actual *application* of nonverbal cues and signals in ongoing natural social interactions.

Our early work on the measurement and use of nonverbal language was built on the work of Minskoff in that we believed then and believe now that she had put forward a viable stage model for nonverbal efficacy. It appeared to us that Minskoff’s approach set forth a sequence of skills, all of which needed to be mastered if a child or adult were to be able ultimately to function effectively in social/interpersonal settings and situations. The progressive nature of Minskoff’s framework also yielded the conclusion that errors at any one point in the sequence could result in failure or problems at others. Thus, were a child to be unable to discriminate cues, he or she would not be able to establish and maintain effective relationships. However, the same outcome – ineffective social relationships – would be manifest no matter *where* in the four-stage sequence a skill deficit was present. If effective social relationships were an indicator of nonverbal accuracy, then, a problem at any one of the four stages could result in the same outcome. However, the location of the inaccuracy would and could vary anywhere from an inability to discriminate cues at all, through an inability to place accurate meanings on discriminated cues, to an inability to use accurately understood cues, to an inability to understand social situations, to an inability to apply accurately used cues in real life.

How then should nonverbal accuracy be defined? Based on the thinking above, we believe that there are at least four major ways to define accuracy. It is possible that applying the definitions to research efforts may allow us to separate the independent streams of research that previously were grouped together under the concept of “accuracy.” For expositional purposes and based upon Minskoff’s stage model for the teaching of nonverbal communication skills, we will briefly describe four types of accuracy: Discriminative Accuracy, Semantic Accuracy, Utilitarian Accuracy, and Relational Accuracy.

1.1 Discriminative Accuracy

Discriminative Accuracy reflects the ability to differentiate nonverbal signs from one another. This is the foundational form of nonverbal accuracy for it is here that children learn most simply that there are different “signs” in their environment – facial expressions that differ, gestures that differ, voice tones that differ, etc. Unless a child sees that facial expressions differ, he or she will never be able to learn that different facial expressions have different meanings. Problems reflecting discriminative inaccuracy will take the form of children’s seeming “not to notice” a stern look on a teacher’s face, or a raising of the voice by an increasingly impatient parent. While it may seem hard to believe that children cannot discriminate differences in nonverbal cues, in early data we collected from a sample of children with significant school and social problems, we observed youngsters who could not identify correctly pairs of faces with different facial expressions as compared with pairs with the same facial expression (Nowicki and Duke 1994). On the expressive side, we made photos of children asked to demonstrate angry faces and then sad faces and found many children whose facial expressions did not look appreciably different to peer-group judges.

The literature focused specifically on Discriminative Accuracy is sparse. We believe that this may be due to an erroneous assumption among researchers that almost everyone can detect differences between facial expressions, voice tones, gestures, and the like. This is an assumption, however, and if it is incorrect, the consequences will have ripples throughout the broader literature on nonverbal communication. Regardless of what level of analysis is applied by researchers – Semantic, Utilitarian, or Relational – a foundational difficulty in simple cue discrimination might be a hidden cause of inaccuracy and social dysfunction. Before assuming that a child or adult *mislabeled* different facial expressions, we must be sure that he or she *sees* different facial expressions.

1.2 Semantic Accuracy

For Minskoff, the second critical skill in nonverbal communication is the ability to label accurately the meanings of cues that are already seen as different. Thus, for example, whereas Discriminative Accuracy ensures that someone sees that different facial expressions of emotion are in fact different, in Semantic Accuracy the person ascribes accurate meanings to each of those expressions. Without Semantic Accuracy, a child might see a pair comprising one angry and one sad face as depicting two angry faces or two sad faces. This would create some difficulty for a child who understands the emotion but does not have the verbal label and much more difficulty for a child who can do neither. The implications of this latter error for social interactions should be clear.

A significant proportion of research on nonverbal accuracy may be placed within the domain of semantic accuracy. Here, we find measures such as the Pictures of Facial Affect (Ekman and Friesen 1976; Matsumoto et al., 2000), the Profile of Nonverbal Sensitivity (PONS, Rosenthal et al. 1979), and the Diagnostic Analysis of Nonverbal Accuracy (DANVA, Nowicki and Duke 1994), and other efforts to assess the ability to label correctly facial expressions, voice tones, gestures, and the like that, on the basis of admittedly varying criteria, have been deemed representative of emotional states or intentions in others. (See also Chapter 7, Patel and Scherer, this volume, for discussion of accuracy of judging vocal cues in particular.) It should be apparent that errors in expressive and/or receptive Semantic Accuracy will result in a variety of social and interpersonal problems. Believing that an angry face is a sad one will lead to ineffective social interactions. Confusing tense pensiveness with silent contentment can alter the course of a loving relationship.

While much empirical research and theorizing regarding nonverbal communication have focused on what we are terming Semantic Accuracy, it is our belief that unless this form of accuracy is seen as just one component of overall nonverbal accuracy rather than its sole or most important determinant, we would be committing a significant error. If a person scores extremely well on tests of Semantic Accuracy this does not mean that his or her social relationships (or anything else ultimately dependent on nonverbal communication skills) will be commensurately as strong. Unless a person learns to accurately apply the perceived meaning of nonverbal cues to ongoing social interactions, Semantic Accuracy would be like being able to catch a baseball one hundred times in a row without dropping it. Unless the skill is seen as one to be applied on the baseball diamond, all one can say is that “this kid sure can catch a ball.” It reflects the difference between knowing what contributes to success and having the skill to actually apply the ability. In the present example, taking the skill to the playing field requires not only knowledge but more ability as well. We call this Utilitarian Accuracy.

1.3 Utilitarian Accuracy

Utilitarian Accuracy is skill in the use of nonverbal knowledge in real life situations. In our baseball analogy, this would mean using basic abilities in fielding and batting in a real game. In social relationships a high level of Utilitarian Accuracy means that a person encodes and decodes nonverbal information during the course of social interactions such that these interactions run smoothly and effectively. For example, a child, Mary, may accurately perceive that her playmate, Dawn, who is sitting alone with her head down during recess, is sad. This would be semantically accurate. However, were Mary to walk over to the Dawn and try to cheer her up or engage her in a game, she would be manifesting Utilitarian Accuracy. It would be expected that people with strong Utilitarian Accuracy skills would

be quite good in short-term social interactions and would be seen as interpersonally “savvy” by others. It would also be the case, however, that high scores on measures of Semantic Accuracy might not fully predict success in short-term social interactions any more than excellence in basic baseball skills would fully predict success on a specific play in a baseball game.

1.4 Relational Accuracy

The fourth form of nonverbal accuracy that we propose is Relational Accuracy. Relational Accuracy differs from Utilitarian Accuracy in that it refers to the ability not only to apply nonverbal knowledge in short-term social interactions such as that of Mary and Dawn on the playground, but to the establishment and maintenance of social relationships over time. To be strong in Relational Accuracy is to know that relationships exist not in a specific moment, but over time, and that the importance of accurately reading and encoding nonverbal information varies according to the nature and level of people’s connections with one another. Specifically, we propose that individuals must know that nonverbal signs present at the beginning stage of a relationship can mean different things than they do in a deeper relationship. Skill in knowing what to say or do as well as what *not* to say or do is critical in developing, strengthening, and maintaining long-term interpersonal relationships. (In large measure this is the goal of all of the other levels of accuracy, but like the skill set in baseball, this level of ability only emerges after much practice of “the fundamentals.”)

Returning to our example of Mary and Dawn, based on Utilitarian Accuracy, Mary’s approaching Dawn and trying to engage her might be a good strategy if Dawn were a new student who just started school that day. However, were it to be the case that Mary and Dawn had been classmates for many years and were Mary to know that sometimes her friend Dawn just needed to have some quiet time, a more highly skilled response to Dawn’s nonverbal display would be to simply go on playing with the other children and wait for Dawn to rejoin the group when she was ready. The point here is that the ultimate form of nonverbal accuracy, the purpose for which we have evolved a set of displays and the ability to read them accurately, lies in the use of nonverbal information to establish and maintain the sorts of long-term connections that help us to survive both individually and as a species.

2 Why is receptive nonverbal accuracy important?

Nonverbal social behavior refers to all those human responses which are not described as overtly manifested in words (either spoken or written) and that convey

meaning (Knapp and Hall 2010). Nonverbal behaviors include facial expressions, paralanguage or prosody, body movement or kinetics, gestures and touching, and proxemics. Nonverbal social skills “include...abilities to encode and decode cues of emotion...to control and regulate emotional displays and ...the management of conversation” (Riggio 1992).

As can be seen by this definition, nonverbal communication includes both the ability to send and to receive nonverbal information. In their meta-analysis of past research focused on the association between these two skills, Elfenbein and Eisenkraft (2010) found that though there was a near-zero correlation for spontaneous, naturalistic, or a combination of display types, there was a significant positive correlation for studies that used intentional communication displays. Building on this set of findings Elfenbein et al. (2010) found further, using a round robin methodology as prescribed by Kenny (1994) and intentional communication of facial expressions, that there was a significant and high correlation between the two abilities.

It is also important to know whether or not nonverbal accuracy is synonymous with general cognitive ability (IQ). Murphy and Hall (2011) meta-analyzed the findings from 38 studies and found a small-to-medium positive effect size that was moderated, among other variables, by whether accuracy was measured via the identification of the target person’s emotions versus the identification of the target person’s intended meaning. They concluded that interpersonal decoding accuracy requires some level of social sophistication and results of this meta-analysis suggest that part of that social sophistication involves the cognitive abilities comprising general intelligence.

Both receptive and expressive abilities are necessary components of the communication process, but in the present chapter we focus on receptive nonverbal skill. While this is only a part of the communicative process, compared to expressive nonverbal skill, there is evidence that receptive nonverbal skills are learned earlier (Ekman and Oster 1982; Feldman and Rimé 1991; Johnson and Myklebust 1967), have yielded more empirical information, and have tests that are more reliable, valid, and easier to administer to a greater numbers of participants (e.g., Rosenthal et al. 1979).

A growing body of empirical research shows that receptive nonverbal processing ability is associated with personal and social adjustment. Regardless of how accuracy of receptive nonverbal cues has been defined and determined, it has been associated with an impressive number and variety of personal and social outcomes.

J. A. Hall, Andrzejewski, and Yopchick (2009) submitted the results of 215 studies to meta-analysis to explore the association of important psychosocial variables like empathy, affiliation, internal locus of control, and social competence, with interpersonal sensitivity as measured by instruments such as the Profile of Nonverbal Sensitivity (PONS; Rosenthal et al. 1979), which asks participants to view video and/or audio clips of a woman and then to use the information gathered to choose

between two options. Significant mean correlations were found for 27 of the 40 categories of psychosocial functioning indicating that interpersonal sensitivity was associated with positive aspects of personality and social functioning.

Consistent with what J. A. Hall, Andrzejewski, and Yopchick (2009) found, lower nonverbal receptive accuracy as measured primarily by tests of Semantic Accuracy has been found to be associated with a variety of indicators of social difficulties including *lower popularity* (Collins and Nowicki 2001), *nonverbal and verbal learning disabilities* (Clark 1992; C. W. Hall et al. 1999), *externalizing problems and conduct disorder* (Cadesky, Mota, and Schachar 2000; Stevens, Charman, and Blair 2001), *depression* (Chen, Tseng, and Huang 2003; Nowicki and Carton 1997), *bipolar disorder* (Brotman et al. 2008), *social anxiety* (Melfsen and Florin 2002; Walker and Nowicki in press), and *Williams Syndrome* (Skwerer et al., in press).

The brief sampling of the abundant research support showing that a variety of receptive nonverbal accuracies are associated with social competence and social adjustment outcomes suggests that accuracy is involved in relating to others in effective ways. Receptive nonverbal accuracy, it seems, may have something significant to do with the process of “getting along with others” and with acquiring, maintaining, and ending relationships effectively (Nowicki, Duke, and van Buren 2008).

As Berscheid and Peplau (1983) stated,

Relationships with others lie at the very core of human existence. Humans are conceived within relationships, born into relationships, and live their lives within relationships with others. Each individual's dependence on other people – for the realization of life itself, for survival during one of the longest gestation periods in the animal kingdom, for food and shelter and aid and comfort throughout the life cycle – is a fundamental fact of the human condition (p. 1).

Our assumption is that one of the most important skills needed to be successful at forming relationships is the ability to accurately identify emotions (and other significant information) in the nonverbal behaviors of others. We are not the first to point this out. The early work of Mehrabian (1968) suggested the importance of nonverbal over verbal “language” in the communication of emotional information crucial for relating successfully to others. Riggio (1986, 1992) pioneered the more recent emphasis on nonverbal accuracy and relationship process by describing the skills necessary for initiating and maintaining interactions with others. A growing body of research supports Riggio's assumption that nonverbal communication skill “plays a critical role in all facets of social life from first encounters with strangers to the development and maintenance of long-term relationships” (1992, p. 10).

To highlight this possibility we offer a relationship model that integrates and extends Riggio's assumption that different social skills are needed for progress from one phase of a relationship to the next, in the hope that it may prove useful in reinterpreting past research findings and focusing future research efforts to understand better the effects of all types of receptive nonverbal accuracy. (For

additional discussion of nonverbal behavior in the context of relationships, see Chapter 19, Guerrero and Wiedemaier, this volume.)

3 A possible relationship framework for understanding receptive nonverbal accuracy

Although there are a number of different ways to describe and conceptualize relationships, most authors agree that they are crucial to our happiness and satisfaction with life (Regan 2011). Beginning with our parents and later with our peers and romantic partners, connecting with others is essential first for surviving physically and later for making friends and life-long intimate relationships (e.g., Ainsworth et al. 1978).

Some scientists believe that the drive to relate and be social may even be innate and programmed into us genetically:

Evolutionary psychology places social interaction and social relationships squarely within the center of the action. In particular, social interactions and relationships surrounding mating, kinship, reciprocal alliances, coalitions, and hierarchies are especially critical, because all appear to have strong consequences for successful survival and reproduction. (Buss and Kendrick 1998, p. 994)

Many relationship theorists would probably agree that close relationships show an orderly progression that may vary in its pattern and speed from initial (simple) to deeper (more complex) interactions as well as in the existence of mechanisms that allow the process to advance or cause it to be impeded. For example in Social Penetration Theory (Altman and Taylor 1973), the mechanism of self-disclosure is highlighted, while in Intimacy Theory (Reis, Clark, and Holmes 2004) responsiveness of partners is seen as the crucial factor. Regardless of the mechanism highlighted it is usually assumed that people who are better at picking up the highlighted aspects of whatever the mechanism may be, be it self-disclosure, responsivity, emotional state or the like, will have better relationship outcomes.

The model we introduce posits that relationships progress through a somewhat orderly sequence of choice, beginning, deepening, and ending phases (Nowicki, Duke, and van Buren 2008). The boundaries of each phase overlap and, though these boundaries are not rigidly defined, the model describes a process from simple to complex and shallow to deep in terms of relating. The model also assumes that progress depends on the use of social skills such as receptive nonverbal ability to help meet the increasingly complex demands that accompany transitions from simple to more complex ways of relating. In this model, a major mechanism that facilitates progress from one phase to the next is social communication. Both verbal and nonverbal social communication are assumed to be necessary for successful relationship movement.

3.1 Relationship stages and the role of accurate receptive nonverbal ability

3.1.1 Choice

At the initial phase of the relationship process the major task is to “pick out” the person with whom to begin the relationship process. Sometimes the “choice” is not really in our control such as when infants are in their relationship with parents or children with teachers, but when we do have some choice, the question is what should we look for in others? Past studies suggest that choosing with whom to begin a relationship can be a surprisingly quick decision based primarily on what is being observed nonverbally. Generally, we look for people who will make us feel at ease and comfortable. Researchers tell us that we look for others who are attractive, who smile, whose tone of voice is nonthreatening, and whose posture is welcoming (e.g., Anderson, Adams, and Plant 2008; Harker and Keltner 2001).

3.1.2 Beginning

Even though forming good and effective relationships may be one of the most important tasks we face throughout our lives, we get relatively little help in making that happen. Most of us have taken classes in written and spoken grammar, history, math and the like, but only a few will have had any formal education in how to connect with others. Of the four relationship phases, the beginning phase is an exception. Through what most of us would call “manners” we have received some training in what to do and what to look for when we first meet someone.

To begin relationships it seems that people first have to notice one another and then to like or be attracted to what they notice (Nowicki and Duke 2002; Regan 2011). Not surprisingly, what makes people noticeable and attractive has been the focus of relationship researchers for decades. Based on their findings it appears that some of the major positive characteristics include physical attractiveness, intelligence, emotional stability, warmth, and empathy (e.g., Eastwick and Finkel 2008; Selfhout et al. 2009).

According to Riggio (1992):

Ability to accurately read these cues is important if the interactants are truly going to understand one another ... it is skill in decoding others' nonverbal cues of emotion that allows interactants to get “in-tune” with one another at an emotional level. The ability to read nonverbal cues sets the stage for higher order emotions and social skills like empathy. By being empathetic interactants may move into the next phase of the relationship process and deepen with one another. (p. 16)

3.1.3 Deepening

Compared to the thousands of interactions we have in our life time an extremely small number of them go on to become deeper friendships and/or romantic rela-

tionships. So the question is what are the processes, events, or behaviors that separate those relationships that go on to deepen from the vast majority that don't? Not as much research has been completed regarding deepening of relationships as there is for their beginnings. (For one exception see Nowicki, Duke, and van Buren 2008, who suggest that complementarity of interpersonal styles using the circumplex model of behavior becomes important in determining depth of relationship. For another exception see Riggio (1992), who suggests emotional regulation as an important skill.) Moreover more research has been focused on romantic as opposed to friendship relationships especially with adults (Heyman et al. 2009; Rhoades, Stanley, and Markman 2010). A majority of the studies have used a "retrospective" methodology in which participants look back over their past relationships to identify factors that may have played a role in deepening their interactions and moved them to become more "intimate." Research using this approach has identified increased contact, discussion of the relationship, tokens of affection, asking for advice from others, and verbal statements of love and caring as being important to making the relationship deeper (Clark, Shaver, and Abraham 1999; Tolhuizen 1989). For example, when looking back over their relationships undergraduate college students mentioned that communication and emotional disclosure, including a broad variety of nonverbal behaviors such as "touching," were useful in making their romantic relationships deeper.

In any case, Riggio (1992) concludes and we agree that nonverbal interaction skills are important in "cementing" and maintaining long-term personal relationships. However, it also seems clear that there is much still to learn about the process of how we go about finding friends or a romantic partner. M. Rothman and Nowicki (2010) and Rosenthal et al. (1979) among others suggest that those who are more accurate in identifying the information in the nonverbal cues of others are more likely to be successful socially, better adjusted, and more likely to impress peers positively. These are characteristics that bode well for the ability to deepen a relationship.

3.1.4 Ending

This is probably the most important yet least investigated phase of relating. When researchers write about endings, it is usually with a negative tone and the use of words like "dissolution, grief, and sadness" (e. g., Harvey and Weber 2002). However, Nowicki and colleagues (Nowicki, Duke, and van Buren 2008) have pointed out that the ending of a relationship is also an important opportunity for the expression of positive feelings and for learning about how one relates. As Kierkegaard (1996) wrote, "Life can only be understood backward. Unfortunately, it must be lived forward." Why is ending and looking back so important? Because it is only when we make ourselves aware of the "life" of our relationship and look back on it that we can examine what we did correctly or incorrectly so that we can use

that knowledge to choose to begin new relationships more effectively. T. S. Eliot (1942) seemed to understand this as well when he wrote, “What we call the beginning is often the end. And to make an end is to make a beginning. The end is where we start from.” Sullivan (1953) was among the first psychiatric theorists to point out that “awareness” of one’s interpersonal behavior, especially its nonverbal aspects, is necessary for learning and change and endings must be dealt with in awareness and energy if we are to learn about ourselves and to move on to better handle whatever comes next in our lives.

3.1.5 Relationships over age: Sullivan’s theory and adult life development

Not only are different receptive nonverbal skills needed to successfully navigate the sequence of phases within a relationship, but they are also necessary for successfully dealing with the relationship changes and requirements at different ages of one’s life. Relationships differ in their quality and importance with age. Certainly most everyone would agree that a two-year-old relates to his or her peers and others differently from a 35-year-old adult and though important at any age, receptive nonverbal accuracy would have differential impact depending on the age of the interactants. However, this is rarely taken into consideration in the study of accuracy of nonverbal processing ability.

The problem is compounded by the fact that we know so little about how accuracies develop and the impact of receptive nonverbal inaccuracies on the lives of the interactants. For example, what are the trajectories of the four major types of accuracy over age and modality? Are they the same or do they differ? More specific to the present chapter, does the impact of accuracy of receptive nonverbal cues change with age? That is, for example, are mistakes in reading emotion in the faces of others more or less important in the relational lives of 10-, 20-, or 50-year-olds? These and many other important questions about the overall impact of accuracy of nonverbal skill across the age span remain unanswered but should be the focus of future research.

Investigators of receptive nonverbal accuracies may want to adopt a developmental perspective whenever they can. While there are any number of possible life-span developmental framework candidates that could be used, we have adopted one that originates from the writings of Harry Stack Sullivan (Sullivan 1953). Sullivan’s theory is especially germane because it emphasizes interpersonal factors including the importance of nonverbal communication in the inability of some to socially adjust. For Sullivan, progress through the developmental stages he describes is characterized by increasingly important and complex relationship competence moving from infancy to childhood to juvenile years to preadolescence to adolescence to adulthood (Nowicki, Duke, and van Buren 2008).

Although Sullivan’s model stops at adulthood, recent writing suggests that developmental change in how we relate continues throughout adulthood. That is,

relationships and the role of nonverbal communication in those relationships may differ depending on whether one is young, middle aged, or older (e.g., Levinson 1978; 1996).

4 Combining the four-phase relationship model and the four types of receptive accuracy into the Relationship Accuracy Framework

The four-phase model of interpersonal relationships is based on the notion that different skills are necessary for successful negotiation of different aspects of interpersonal process. We first introduced a simpler version of this model in 1983 (Duke and Nowicki 1983) and have applied it clinically as well as empirically for the past three decades. The multiplistic accuracy framework introduced in this chapter is a more recent addition to our conceptualization of relationships and relationship success and admittedly requires a thorough empirical evaluation. However, we believe that it takes into account that different relational skills are necessary at different points in a relationship (Riggio 1992) and that different nonverbal skills play a part in the success or failure at each point in the relationship process.

PHASE ACCURACY	Choice Phase	Beginning Phase	Deepening Phase	Ending Phase
Discriminative Accuracy-DA	Does not know that or how people differ	Does not try or tries with random people	Does not get here	Does not get here
Semantic Accuracy-SA	Picks "wrong" people	Non-starts due to wrong interpretation	Moves too quickly or too slowly	Does not understand it's time to go
Utilitarian Accuracy-UA	N/A	Does not apply known nonverbal info	Does not know how to deepen relationships	Does not know how to end
Relational Accuracy-RA	N/A	Can't see long term impact of starting well	Does not know when to deepen	Does not know when to end

Figure 1: The relationship phase/nonverbal accuracy matrix

The Relationship Accuracy Framework depicted in Figure 1 highlights how complex defining accuracy process truly is. The sixteen cells in this framework mean that researchers cannot just talk about "accuracy," but must also delineate

what type of accuracy they want and at what point in the relationship process it is to be measured. The framework becomes even more complicated because it must be applied to different nonverbal modalities. One goal of this approach is to raise awareness of the importance of assessment in determining individual differences in receptive nonverbal accuracy in laying the groundwork for the construction of appropriate interventions to help those whose accuracies are not as high as those of their peers.

5 Issues that have arisen when applying a Semantic Accuracy of receptive nonverbal processing ability

Our own research program has been directed toward establishing the viability of relatively simple tests of Semantic Accuracy in which individuals look at or hear stimulus cues and then choose which of four emotions they believe is being communicated. However, even at this relatively simple level of accuracy incorrect responses can create interpretive problems when a stimulus is inaccurately perceived. Was it missed because of a lack of discriminative skill among the faces or because of a lack of ability to identify specific emotions or perhaps both? The same problem exists for other Semantic Accuracy tests such as the Interpersonal Perception Task or IPT (Costanzo and Archer 1989). In the IPT individuals are shown video scenes of interactions and asked to choose the correct statements about what is transpiring in the scenes. It is assumed that to make a correct response individuals are able to read the simple and complex nonverbal clues that are offered within the scenes and use them to choose the correct response out of those offered. What can be concluded about individuals who make errors here? What informational cues did they fail to read that led them to mistake what was happening in the scene? Was it the facial expressions or the postures or the, gestures tone of voice, or personal space that were misread or were they read accurately but then individuals failed to apply the information appropriately to arrive at the correct answer? As practicing clinical psychologists our focus has always been on understanding and helping those who do not perform as well as their peers especially when it concerns social interactions. We want to know what kind of problems they are having and their source. Are they occurring at the simplest levels of accuracy or at the more complex ones or perhaps both? Assessment of the source of the inaccuracy is crucial because it provides the information that could help guide remediation efforts to improve “social skills.”

Clearly, receptive nonverbal accuracy is a topic that could fill many volumes, but for the remainder of the chapter we would want describe how we have chosen to approach and deal with the problem of receptive nonverbal accuracy. The issues

that we focus on are ones that could arise when applying any definition of accuracy in reading nonverbal cues. Certainly our approach to accuracy is only one among many that could be and have been used appropriately by researchers in this area. As expected of all researchers regardless of their definition of accuracy, our accuracy framework includes a clearly stated definition of accuracy that can be used to guide the development of construct valid measuring instruments to identify accuracy deficits and the building of intervention programs to remediate deficits once they are found.

We now turn our attention to our own approach to the problem of accuracy of receptive nonverbal communication performance. Our definition of accuracy is limited to the ability to identify some of the most common simple emotions such as happy, sad, anger, and fear in the nonverbal communications of others (Baum and Nowicki 1998; Nowicki and Carton 1993; Nowicki, Glanville, and Demertzis 1999; Nowicki and Duke 1994; Pitterman and Nowicki 2004; Rothman and Nowicki 2004). In the pyramid of skills that are theoretically needed to be “emotionally intelligent” (Mayer, Roberts, and Barsade 2008), the identification of simple emotions in the nonverbal cues of others is the most basic ability and provides the foundation for all the higher level socioemotional learning and functioning.

It is important to note here that one certainly can be adept at a simple level of accuracy and still experience any number of socioemotional problems at deeper levels of relating that demand more complex levels of accuracy and skill. However, it is also true that difficulties identifying simple emotions will increase the likelihood of experiencing social difficulties in complex situations. One practical consequence of this fact is that individuals who have difficulty identifying emotions in facial expressions, tones of voice, and postures, which are Semantic Accuracies, may not be able to fully benefit from “social skills” training programs, such as the Skills Streaming Program which focus more on Utilitarian Accuracy. For example, it is common in social skills programs to teach individuals how to respond appropriately when someone is angry. While this certainly is a useful skill, if participants cannot identify whether someone is angry or not, it cannot be applied successfully.

Reducing the definition of receptive nonverbal accuracy to a simple and basic level as we have done does not, unfortunately, eliminate serious conceptual, empirical, and theoretical problems in understanding and using “accuracy.” With that in mind, we now turn our attention to the some of the concerns that have arisen from attempts to apply a Semantic Accuracy definition of receptive nonverbal emotional ability.

5.1 What is the association between the ability to identify and to express nonverbal emotional cues accurately?

Over the past decade, relatively few researchers have reported both the ability to identify (receptive) and to send (expressive) nonverbal emotional cues or have

discussed the extent to which they may be associated (Elfenbein and Eisenkraft 2010). Since few studies include both sending and receiving of nonverbal cues, a significant question is to what degree are they associated? Are we dealing with one general nonverbal communication factor or at least two orthogonal ones?

For an answer to this question we turn to a meta-analysis completed by Elfenbein and Eisenkraft (2010). They reviewed both the theoretical basis for predicting positive or negative associations and the empirical data dedicated to evaluating the association. Theoretically, perhaps the most often used reason for predicting a positive association between the two skills originates in the concept of emotional intelligence (Mayer, Roberts, and Barsade 2008). Similar to the concept of a general or “g” factor that is hypothesized to underlie cognitive intelligence, abilities to identify and express basic emotions nonverbally are proposed in this perspective to be aspects of one general nonverbal communication factor. In contrast, there are theories that presuppose a negative or neutral association between the two nonverbal abilities. A frequently applied theoretical example of this perspective originates in the socialization theory of Halberstadt (1986). She suggests that “When the family environment is low in expressiveness, individuals must become sensitive to the most subtle displays of emotion in order to relate effectively with their family members” (p. 827). The opposite is also likely to be true in families. That is, in high expressive environments, family members do not have to develop effective receptive skills to interact within the family (see also Halberstadt, Denham, and Dunsmore 2001).

Finally, Elfenbein and Eisenkraft suggest the possibility that typical and unintentional receiving and sending skills may not be related to each other but may represent two separate and independent abilities. A plausible theory of this perspective proposes a neurological explanation in which the two skills are assumed to be dissociated from one another because they have distinct neural and independent neural pathways (Borod et al. 1990).

Elfenbein and Eisenkraft surveyed 40 studies that included 1,926 participants. Overall, they found simple correlations ranging from +0.80 to -0.64. More importantly, the meta-analysis showed that significant positive correlations were found only when the emotions were communicated and identified within intentional communication situations and were nonsignificant for spontaneous, naturalistic or a combination of display types.

5.2 How should receptive nonverbal emotion accuracy scores be reported?

Not only do studies on nonverbal communication of emotion rarely evaluate the association between receptive and expressive skills, but of those that focus on receptive ability, many use only adult facial expressions that most often are Cauca-

sian as the main measure of receptive nonverbal accuracy. In such cases, researchers who use simple emotion accuracy definitions tend to report only *total* and not *specific* scores. Reporting accuracy in this manner raises some important research questions that need answering.

5.2.1 Why are other nonverbal modalities such as paralanguage, postures, and the like not included more often?

The emphasis on adult facial expressions suggests that the face may be the most relevant of the possible nonverbal modalities and the extensive use of adult Caucasian faces suggests further that results not only are generalizable across age and modality, but perhaps across race and culture as well (Ekman 1994; Russell 1994). In regards to the generalizability across race and culture, recent work suggests that there may be “in-group” advantages that are produced when individuals from a culture view or listen to nonverbal cues from their own rather than other races and cultures (e.g., Elfenbein and Ambady 2003; Wickline, Bailey, and Nowicki 2009; see also Chapter 23, Matsumoto and Hwang, this volume). The fact that participants may be less accurate at identifying faces of other racial groups suggests that more conceptual and empirical work is needed for all levels of accuracy.

5.2.2 Even when just one nonverbal modality is used why are not specific emotion accuracy scores reported more frequently?

The reporting of a single accuracy (or error) score suggests that receptive nonverbal accuracy is a single, global ability. As we mentioned above there are theoretical and practical implications of reporting a single score.

Besides researchers not using nonverbal stimuli that allow for identifying emotions that systematically differ in age or race (For exceptions, see Chronaki 2011; Matsumoto et al. 2000; Tseng, Chen, and Huang 2009) they also have failed to use standardized stimuli that reflect systematic differences in the intensity of emotion. Again, this is consistent with the presumption of a single underlying ability that not only cuts across modalities, but also levels of intensity, age, and cultural/racial characteristics.

Not only do researchers sometimes fail to report specific accuracy scores, but they also often fail to report misattribution scores, that is, the erroneous answers given in place of the correct ones. Presentation of “confusion matrices” or other ways of showing patterns of error scores would reveal whether errors were systematic (e.g., all anger) or random (e.g., equally distributed among emotions). This is important because the form that errors take may relate in important ways to types of behavior in a variety of social areas as will be described below.

5.2.3 Is there one-general-ability to read emotions or are there specific, largely separate abilities to read different emotions?

The answer to this question has significant implications for how researchers theorize about nonverbal receptive communication and how they apply their theories to such practical matters as constructing assessment devices to identify inaccuracies and appropriate forms of remediation to eradicate inaccuracies when found.

For example, in terms of theory, if receptive nonverbal emotion accuracy is best conceptualized as a global ability then several assumptions follow. First, individuals would have greater or lesser amounts of that ability and a single score would best reflect that fact. Second, tests of receptive nonverbal accuracy should be constructed to reflect its global nature. Tests of receptive global ability should possess very high internal consistency and high inter-modality and high inter-emotion correlations.

In contrast, if receptive nonverbal accuracy is not best conceptualized as one-general-ability but rather as being composed of a number of separate abilities differing by modality and emotion, then there are different implications. Rather than reporting total accuracy scores, it would be more appropriate to report separate scores for each modality so that patterns of outcomes could be revealed. In fact, from such a theoretical perspective not only should accuracy scores of different modalities be reported but so should the specific emotion accuracies within each of the modalities. This would allow for the development of profiles of accuracy scores across modalities and emotions. Construct validity in this case would not be so focused on developing modality tests that are highly intercorrelated. Rather, validity indices would be assessed by the use of a variety of different profiled accuracy scores that would come from the different modalities and from the different emotions within each modality.

Although there is no comprehensive review of how emotions in general or emotions within modalities correlate with one another, Hall (2001) pointed out that it does not always follow that high internal consistency of items is required to attain satisfactory levels of validity. In her analysis of the PONS she pointed out that its average intercorrelation of items is around 0.03 even though the internal consistency of the full PONS remains high (Rosenthal et al. 1979) and the test has garnered impressive evidence of its validity. Bänziger et al. (2011) point out further that such relationships are possible because internal consistency is determined not only by the number of items, but also by the average correlation among the items. This state of affairs creates a situation in which items that have modest correlations with the criterion can produce increases in validity as the n increases, but decreases in validity when the item intercorrelations decrease. Therefore test constructors may prefer to have a test in which items relate to validity indices that possess many items of this type and are low in intercorrelation.

If typical patterns of accuracies or inaccuracies are found to be associated with various syndromes, then researchers could direct their efforts to finding out if the

patterns resulted from or were maintained the syndrome itself or perhaps even if the deficits in accuracy were somehow involved in causing the syndrome to develop in the first place. To examine these possibilities at the level of simple emotions, investigators can use a scale that measures the ability to identify emotion (e.g., Pictures of Facial Affect, Ekman and Freisen 1976). We've chosen to use a test of which we are most familiar, the DANVA2 (Nowicki and Duke 1994).

5.2.4 Diagnostic Analysis of Nonverbal Accuracy2 (DANVA2)

The DANVA2 consists of adult and child facial expressions, adult and child vocal expressions, and adult postures. All five DANVA2 subtests have been used with a variety of participants differing in age, sex, race, cultural background, intellectual ability, and psychological adjustment (Nowicki 2011). Although the standardized versions of each test consist of 24 stimuli, there are shorter and longer forms available. Each subtest was constructed consistent with the following procedures.

First, each test was constructed independently. This was done because there is little theoretical or empirical agreement on the underlying relationship of separate nonverbal processing skills with one another. Second, stimuli were selected on the basis of a preset percentage (80%) of judges agreeing on the identification of a particular emotion. Of the five general ways to establish a criterion of accuracy for nonverbal processing skill described by Cook (cited in Rosenthal et al. 1979, p. 19), this is the method that most closely reflected the ecological situation individuals face in their daily interactions. Third, a relatively high percentage of inter-judge agreement was used for item selection because a major goal of the DANVA tests was to identify individuals who could not read emotions as well as most people. Fourth, including low as well as high intensity stimuli was important because so much of what happens in everyday social interactions requires the accurate reading of low intensity emotional messages. Fifth, only the basic emotions of happy, sad, angry, and fearful were included because these are the ones that most frequently occur in general life and are assumed to be learned by 10 years of age (Camras and Allison 1985; Custrini and Feldman 1989).

5.2.4.1 DANVA2 construct validity and underlying structure

Reliability and validity evidence for the DANVA2 is reported in the manual (Nowicki 2011). Internal consistency as measured by coefficient alpha ranged from 0.61 for postures to 0.73 for voices and 0.74 for faces. The DANVA2 manual presents validity evidence from over 400 studies in support of the tests' ability to be associated with positive personal and social outcomes.

Further evidence to provide support for the underlying structure of the DANVA is reported in the manual (Nowicki 2011) and, in addition, comes from a study by Ciucci et al. (2011). They administered the DANVA2 adult and child faces and adult

postures to 947 elementary Italian school age children. Although the research evidence suggests that the DANVA2 may be a reliable and valid instrument, researchers have not examined the actual structure of the test (and whether it generalizes to another cultural population). Thus the purpose of their study was to evaluate the DANVA2 using a multi-trait, multi-method covariance matrix (MTMM) approach. Given that the DANVA2 uses multiple measures (or ‘traits’ – that is, anger, happiness, sadness, and fear recognition) obtained by multiple nonverbal channels or methods (child and adult facial expressions and adult postures), it is important to know if the underlying structure reflected the organization of the tests. MTMM is an especially apt way of evaluating construct validity because it provides a rigorous framework for simultaneously examining both convergent and discriminant validity.

Two linear models were tested sequentially: a general confirmatory factor analysis (CFA) model and a correlated uniqueness confirmatory factor analysis model (CU). The models were tested using Mplus 4.0 (Muthén and Muthén, 2006). All the models were evaluated by means of the following overall indices: the chi-square (χ^2) statistic, the Root-Mean-Square Error of Approximation (RMSEA) and the Comparative Fit Index (CFI).

Support was found for (1) an underlying factor structure consistent with the DANVA2’s three separate tests that measure four separate basic emotions, (2) acceptable internal consistency within each independent test and emotion, (3) convergent validity as shown by an association with another established measure of adult faces (the Pictures of Facial Affect, Ekman and Friesen 1976), and (4) criteria related validity as measured by teacher-rated academic achievement and sociometrically assessed popularity. Results suggest that the DANVA2’s adult and child faces and, to a lesser extent, adult postures, possess a viable underlying structure as well as internal consistency and set of construct validity relationships that seem similar to those that were found in United States samples (Nowicki 2011).

5.2.4.2 Unique DANVA2 error profiles for diagnostic groups

If receptive accuracy scores are best conceptualized by total scores, then profiles of abilities are not necessary. People either are high or low in a general ability. However, if accuracy scores are seen as reflecting somewhat independent abilities then they should be reported for each separate modality and emotion so that possible profiles of accuracy could be revealed.

Consistent with this approach, Nowicki and colleagues, along with others (e.g., Cadesky, Mota, and Schachar 2001) have completed studies to see if there are unique patterns of inaccuracies in identifying emotions in facial expressions, paralinguistic, and postures that may differentially characterize diagnostic entities such as social anxiety (Walker and Nowicki in press), schizotypal personality disorder (Wickline et al. in press), autism spectrum disorder (Doody and Bull 2011), and

externalizing behaviors (Ransom and Nowicki 2007). We will describe two examples next.

5.2.4.3 Unique DANVA accuracy profile characterizing conduct disorder

Cadesky, Mota, and Schachar (2000) administered the DANVA facial expressions and voices tests to children diagnosed with attention-deficit/hyperactivity disorder (ADHD), conduct disorder, both ADHD/CD, as well as typical controls (TC). They predicted that the CD and ADHD children would perform worse than the TP children and that, because of the aggressive behavior characterizing the behavior of CD children, their errors would show a bias toward anger that would differentiate them from the ADHD group whose errors would tend to be random because of their inattention and response impulsivity.

As predicted, CD and ADHD children were significantly less accurate at identifying emotions than TC children in both faces and voices. Further analyses revealed, also as predicted, that while the errors of the ADHD children were random in nature, the CD group errors tended to involve *misidentifying* emotions as *anger*. Cadeskey et al. concluded that their results supported the idea that social deficiencies associated with CD may arise from a biased perception of emotion, whereas social problems in ADHD could originate from a failure to attend to the appropriate cues of affect. Of course, causality could not be evaluated with the study design.

5.2.4.4 Unique DANVA accuracy profile characterizing social anxiety

A similar approach was used in a study of socially anxious children completed by Walker and Nowicki (in press). They looked at the ability of children to identify emotions in adult and child facial expressions, adult and child paralinguistic, and adult postures, in socially anxious as compared to ADHD and typical children. Children were administered the DANVA2 as part of the intake procedure at a social skills center.

The authors predicted that both socially anxious and ADHD children would make more errors than typical comparison children but that the socially anxious children would show a systematic pattern of errors involving missing anger that would be related to their social anxiety while ADHD children's errors would be more random. As predicted, socially anxious and ADHD children made more errors than typical children and ADHD children's errors were random while socially anxious children made systematically more errors identifying *anger* and *fear* on child faces and *anger* in adult postures. Misattribution analyses of the errors made to fear and anger stimuli revealed that when socially anxious children missed *anger* they were most likely to mistakenly choose *sad* and when they missed *fear*, they more likely to respond with *happy*.

The pattern of errors made by socially anxious children could create social situations in which they would have a greater chance of being rejected by others. Approaching someone who is thought to be sad but who is, in reality, angry could certainly lead a child to develop feelings of apprehension and anxiety. In contrast to the conduct disordered children in the Cadesky, Mota, and Schachar (2000) study whose problem was reading anger when it was not there, the problem for the socially anxious children was that they did not read it when it was; and in addition, they systematically saw anger cues as being sad ones. While the patterns of errors found by Cadesky et al. and Walker and Nowicki suggest that there may be different patterns of Semantic Accuracies consistent with particular social interaction problems children are experiencing, the findings must be replicated before being accepted.

5.3 Is Semantic Accuracy affected by situational factors?

Of the literally thousands of studies involving accuracy of receptive nonverbal emotion, relatively few have investigated the potential effect of situational factors on accuracy. One such situation occurs when “cognitive overload” may reduce the ability to correctly read the emotional cues as described in the following study.

The study of Semantic Accuracy has typically been done under the assumption that skill in identifying the meanings of nonverbal signs is a stable entity, metaphorically a trait versus a state. However, Shen (1997) demonstrated that the capacity to “read” nonverbal cues accurately can be adversely affected by stress and anxiety such that people who are ordinarily able to read cues accurately experience interference with that capacity.

Shen divided the DANVA voices and faces subtests into three equivalent parts and administered the stimuli to college students under three different conditions. In condition one, participants completed one third of the DANVA stimuli in the usual manner. In condition two they were exposed to a noxious auditory distraction while responding to DANVA Faces. In the third condition, they were exposed to high intensity visual stimulation while responding to the DANVA voices. Shen reported that for both DANVA Voices and DANVA faces, both auditory and visual stress conditions resulted in significant increases in errors for both males and females. His findings suggest strongly that nonverbal accuracy may not be a trait-like variable but might interact with situation in some significant ways. This would be consistent with the experience wherein people who are usually very perceptive seem to miss things when under stress or when fatigued. The jury is still very much out on the phenomenon that Shen found. A number of studies have reported evidence for and against the notion of temporary disruptions of nonverbal perceptivity (e.g., Ambady and Gray 2002; Patterson and Stockbridge 1998; Tracy and Robbins 2008). Clearly, further research is needed in this potentially important area.

Although cognitive overload may negatively impact one's usual ability to accurately identify emotions, it is not clear if increasing motivation will have the opposite effect (Hall et al., 2009). Horgan and Smith (2006), for example, reasoned that women may have an advantage over men because performance on interpersonal sensitivity tests is that such tests are more congruent with women's interpersonal goals. They used the Interpersonal Perception Task-15 (IPT-15) and found that women were relatively less accurate on the IPT-15 when they were led to believe that it measured the ability to do interrogation in the military. Men, on the other hand, were less accurate when they were led to believe that the test was an indicator of judgment used by social workers.

In contrast to the fact that reduced motivation had a negative impact on accuracy of men and women by making the goals gender incongruent, Hall et al. (2009) found that a variety of motivational incentives failed to improve accuracy as measured by interpersonal sensitivity. They conducted 11 experiments through which they evaluated whether monetary incentive, ego motive, forewarning that accuracy would be tested, exhortation to try hard, and, as Horgan and Smith (2006) did above, framing the interpersonal sensitivity test description to suggest that it is relevant to one's own gender. Analyses revealed that none of these attempts to use motivation to increase receptive nonverbal accuracy was successful nor did they have a differential impact on men or women. They concluded that since trying harder did not help nonverbal accuracy, nonverbal accuracy may be based instead on a person's knowledge of the content domain.

5.4 Can deficits in Semantic Accuracy be remediated successfully?

Nonverbal communication, like its verbal counterpart, appears to be a learned organized sign system that develops with age and is essential for social interaction (Ekman and Friesen 1975; Nowicki and Duke 1994). Most would accept that there are significant biological contributions to the acquisition of nonverbal ability skills in the form of pre-wired connections that have evolved phylogenetically because of their usefulness for survival of the individual and that perception of facial expressions, and perhaps tone of voice and postures, are part of this biological apparatus (Harris 1995). In contrast, though the rudimentary aspects of nonverbal communication may be biologically present and required, others suggest that it is primarily cultural and social experiences that shape the learning of this skill (e.g., Saarni 1999).

If the ability to identify emotion in the nonverbal cues of others has a significant learning component then knowing how this skill is learned could be very useful in developing programs to teach it to children and adults, especially those who are less skilled than their peers. The question of exactly what to teach is

complicated by the fact that there is a lack of information about the learning mechanisms and accuracy trajectories of the separate nonverbal modalities and specific emotions over age. Because of this fact, even simple questions may be difficult to answer. Are faces learned before voices? Is anger learned before sadness? Is anger learned before sadness in faces, but perhaps not in voices and postures? While there are some useful research findings (e.g., Halberstadt, Denham, and Dunsmore 1997; Walker-Andrews 1997), there is much more to know more about the development and age trajectories of nonverbal accuracies.

In spite of the lack of knowledge about the “how” and “why” of receptive nonverbal skill acquisition, research/clinicians have found ways to help those who have deficits in accuracy now. For example, Lerner and Levine (2007) found that adolescent students diagnosed with Aspergers Disorder improved their ability to recognize emotion in facial expressions by participating in an intervention program that emphasized drama and play-acting nonverbal skills. Krueger, Ambrosino and Kapsch (2009) had success in improving not only the ability to read emotions in high-risk preschool children but also their academic reading performance by directly teaching children to recognize what facial movements related to which emotions. While the reasons for this improvement in academic matters is a matter of conjecture, explanations include (1) the possibility that many preschool books include a number of illustrations of faces improved ability to read faces helped in the understanding of the words that were presented on the same page and/or (2) that improved ability to read emotions in faces helped children to “read” their teachers better and by improving their relationship with them could learn more effectively.

In our own program, we favor directly teaching individuals how to identify emotion nonverbally. This direct teaching approach is similar to what would be used to help someone who had a deficit in spelling. The exact nature of the deficit, in this case a nonverbal accuracy deficit, is assessed and then “homework” and exercises are instituted to help children learn what they have failed to learn through the usual informal and indirect means that characterize receptive nonverbal accuracy learning. We have developed a direct teaching framework called the R-DANVA that describes a sequence of direct learning that takes the student from *discrimination* to *identification* to *expression*, and finally to *application* of what was learned, paralleling the Discriminative, Semantic, Utilitarian, and Relational accuracies described earlier. It owes much to a traditional intervention framework for remediating verbal learning disabilities (Minskoff 1980a; Minskoff 1980b).

Grinspan, Johnson, and Nowicki (2003) used the R-DANVA as a framework to improve the ability to identify emotion in the facial expressions of children in the third grade. Students with below average scores in identifying emotion were randomly placed in experimental or comparison groups. Students in the intervention group met with experimenters for six half-hour sessions over a four-week period during which they were administered the R-DANVA procedures.

Students in the R-DANVA group significantly improved their ability to identify emotions in DANVA2 facial expressions from pre to post testing while the comparison group showed no change over time. Based on the findings, Grinspan et al. cautiously concluded that such “academically friendly” interventions like the R-DANVA could be effectively used in school settings to improve receptive nonverbal accuracy.

While Krueger et al. (2009) and Grinspan, Johnson, and Nowicki (1999) focused primarily on children whose deficits are assumed to be environmental, Randice-Neuman et al. (2009) developed an intervention that focuses on adults suffering from Acquired Brain Injury (ABI). Participants were individuals who were one-year post injury, between the ages of 18 to 65, and possessed basic communication skills. Those with ABI tend to develop problems with social adjustment after their injury. One of the sources of adjustment difficulties was assumed to be deficits in basic Semantic Accuracy or the ability to identify emotions in facial expressions. Randice-Neuman et al. used two types of intervention both of which included the participants’ own emotional experiences. In the facial affect recognition (FAR) intervention, participants were taught to recognize emotions from facial expressions by attending to important facial features and by understanding their own emotional experiences. The comparison intervention used written stories to teach participants to infer characters’ emotion from social contexts and then relating the story to their own personal experiences. The FAR intervention had a more significant impact on the ability to read emotion in faces and to infer emotions from context compared to the comparison group in which they received training on emotional inference from stories. The authors concluded that training can improve emotion perception in patients with ABI. Although further research is needed, the interventions are clinically practical and show promise for the population with ABI.

6 Conclusion

Researchers have come a long way in their understanding of the importance of receptive nonverbal accuracy as well as also becoming more aware of its complexities. Too often nonverbal behavior has been treated simplistically by the public and at times by researchers as well. To remind researchers that not all accuracies are the same, we introduced a model that suggests four different types of accuracy based on complexity: Discriminative, Semantic, Utilitarian, and Relational. We offered the view that one of the most important functions of receptive nonverbal skill is its role in the initiation and maintenance of relationships. We lamented the lack of information about how any of the accuracies in any of the nonverbal modalities and in any of the emotions develop and change and we urged researchers to turn their attention to gaining this knowledge.

References

- Ainsworth, M. D., M. C. Blehar, E. Waters, and S. Wall 1978. *Patterns of Attachment: A Psychological Study of the Strange Situation*. Hillsdale, NJ: Lawrence Erlbaum Associates.
- Altman, I. and D. A. Taylor 1973. *Social Penetration: The Development of Interpersonal Relationships*. New York: Holt, Rinehart & Winston.
- Ambady, N. and H. Gray 2002. On being sad and mistaken: Mood effects on the accuracy of thin slice judgments. *Journal of Personality and Social Psychology* 84: 947–961.
- Anderson, S. L., G. Adams, and V. C. Plant 2008. The cultural grounding of personal relationship: The importance of attractiveness in everyday life. *Journal of Personality and Social Psychology* 95: 352–368.
- Bänziger, T., K. R. Scherer, J. A. Hall, R. Rosenthal 2011. Introducing the MiniPONS: A short multichannel version of the Profile of Nonverbal Sensitivity (PONS). *Journal of Nonverbal Behavior* 35: 189–204.
- Baum, K. and S. Nowicki 1998. Perception of emotion: Measuring decoding accuracy of adult prosodic cues varying in intensity. *Journal of Nonverbal Behavior* 22: 89–109.
- Berscheid, D. and L. A. Peplau 1983. The emerging science of relationships. In: H. H. Kelley, E. Berscheid, A. Christensen, J. H. Harvey, T. L. Huston, G. Levinger, E. McClintock, L. A. Peplau, and D. R. Peterson (eds.), *Close Relationships*, 1–19. New York: W. H. Freeman & Company.
- Borod, J. C., J. Welkowitz, M. Alpert, A. Z. M. Brozgold, C. Martin, and E. Peselow 1990. Parameters of emotional processing in neuropsychiatric disorders: Conceptual issues and a battery of tests. *Journal of Communicative Disorders* 23: 247–271.
- Brotman, M. A., A. E. Guyer, E. S. Lawson, S. E. Horsey, B. A. Rich, D. P. Dickstein, D. S. Pine, and E. Leibenluft 2008. Facial emotion labeling deficits in children and adolescents at risk for bipolar disorder. *American Journal of Psychiatry* 165: 385–389.
- Buss, D. M. and D. T. Kenrick 1998. Evolutionary social psychology. In: D. T. Gilbert, S. T. Fiske, and G. Lindzey (eds.), *The Handbook of Social Psychology*, 4th ed., Vol. 2, 982–1026. Boston: McGraw-Hill.
- Cadesky, E. B., V. L. Mota, and R. J. Schachar 2000. Beyond words: How do children with ADHD and/or conduct problems process nonverbal information about affect? *Journal of the American Academy of Child and Adolescent Psychiatry* 39: 1160–1167.
- Camras, L. A. and K. Allison 1985. Children's understanding of emotional facial expressions and verbal labels. *Journal of Nonverbal Behavior* 9: 84–94.
- Chen, S., W. H. Tseng, and Y. Huang 2003. *Perception of facial emotions, interpersonal anxiety and dysphoric mood: Culture-relevant and gender-differentiated?* Poster presented at the meeting of the American Psychological Association, Toronto, Canada.
- Chronaki, G. 2011. *A behavioural and electrophysiological exploration into facial and vocal emotion processing in children with behaviour problems*. An unpublished doctoral dissertation. Southampton University, Southampton, England.
- Ciucci, E., A. Nocentini, P. Calussi, E. Menesini, and S. Nowicki 2011. *Construct validity of the Diagnostic Analysis of Nonverbal Accuracy (DANVA) in a sample of Italian school children*. Unpublished manuscript, Florence University, Italy.
- Clark, R. 1992. *Receptive nonverbal accuracy in nonverbal learning disabled, verbal learning disabled, and non-learning disabled children*. Unpublished doctoral dissertation, Wisconsin School of Professional Psychology, Milwaukee, WI.
- Clark, C. L., P. R. Shaver, and M. F. Abrahams 1999. Strategic behaviors in romantic relationship initiation. *Personality and Social Psychology Bulletin* 23: 707–720.
- Collins, M. and S. Nowicki 2001. African American children's ability to identify emotion in facial expressions and tones of voice of European Americans. *Journal of Genetic Psychology* 162: 334–346.

- Costanzo, M. and D. Archer 1989. Interpreting the expressive behavior of others: The Interpersonal Perception Task. *Journal of Nonverbal Behavior* 13: 225–245.
- Custrini, R. J. and R. S. Feldman 1989. Children's social competence and nonverbal encoding and decoding of emotion. *Journal of Clinical Child Psychology* 18: 336–342.
- DePaulo, B. M. and R. Rosenthal 1979. The structure of nonverbal decoding skills. *Journal of Personality* 47: 506–517.
- Doody, J. P. and P. Bull 2011. Asperger's syndrome and the decoding of boredom, interest, and disagreement from body posture. *Journal of Nonverbal Behavior* 35: 87–100.
- Duke, M. P. and S. Nowicki 1983. A social learning theory analysis of interaction theory concepts and a multidimensional model of human interaction constellations. In: J. C. Anchin and D. J. Kiesler (eds). *Handbook of Interpersonal Psychotherapy*. 78–94. New York: Pergamon Press.
- Eastwick, P. W. and E. J. Finkel 2008. Sex differences in mate preferences revisited: Do people know what they initially desire in a romantic partner? *Journal of Personality and Social Psychology* 94: 245–264.
- Ekman, P. 1994. Strong evidence for universals in facial expression: A reply to Russell's mistaken critique. *Psychological Bulletin* 115: 268–287.
- Ekman, P. and W. V. Friesen 1975. *Unmasking the Face*. Englewood Cliffs, NJ: Prentice-Hall.
- Ekman, P. and W. V. Friesen 1976. *Pictures of Facial Affect*. Paolo Alto, CA: Consulting Psychologists Press.
- Ekman, P. and H. Oster 1982. Review of research, 1970–1980. In: P. Ekman (ed.), *Emotion in the Human Face*. 4–29. Cambridge: Cambridge University Press.
- Elfenbein, H. A. and N. Ambady 2002. On the universality and cultural specificity of emotion recognition: A meta-analysis. *Psychological Bulletin* 128: 203–235.
- Elfenbein, H. A. and N. Eisenkraft 2010. The relationship between displaying and perceiving nonverbal cues of affect: A meta-analysis to solve an old mystery. *Journal of Personality and Social Psychology* 98: 301–318.
- Elfenbein, H. A. M. D. Foo, M. Manda, R. Biswal, N. Eisenkraft, A. Lim, and S. Sharma 2010. Individual differences in the accuracy of expressing and perceiving nonverbal cues: New data on an old question. *Journal of Research in Personality* 44: 199–206.
- Eliot, T. S. 1942. *Little Gidding* (No. 4 of 'Four Quartets') Verse V.
- Feldman, R. S. and B. Rime. (eds.) 1991. *Fundamentals of Nonverbal Behavior*. New York: Cambridge University Press.
- Fridlund, A. J., P. Ekman, P., and H. Oster 1987. Facial expressions of emotion. In: A. Siegman and S. Feldstein (eds.), *Nonverbal Behavior and Communication*, 143–224. Hillsdale, NJ: Lawrence Erlbaum Associates.
- Glanville, D. and S. Nowicki 2002. Facial expression recognition and social competence among African American elementary school children: An examination of ethnic differences. *Journal of Black Psychology* 28: 318–329.
- Grinspan, D., A. K. Johnson, and S. Nowicki 2003. Improving the ability of elementary school-age children to identify emotion in facial expression. *Journal of Genetic Psychology* 164: 88–100.
- Halberstadt, A. 1986. Family socialization of emotional expression and nonverbal communication of styles and skills. *Journal of Personality and Social Psychology*, 51: 827–836.
- Halberstadt, A. G., S. A. Denham, and J.C. Dunsmore 2001. Affective social competence. *Social Development* 34: 3–51.
- Hall, C. W., A. Peterson, R. E. L. M. Webster, L. M. Bolen, and M. Brown 1999. Perception of nonverbal social cues by regular education, ADHD, and ADHD/LD students. *Psychology in the Schools* 36: 505–515.
- Hall, J. A. 2001. The PONS test and the psychometric approach to measuring interpersonal sensitivity. In: J. A. Hall and F. J. Bernieri (eds.), *Interpersonal Sensitivity: Theory and Measurement*, 143–160. Mahwah, NJ: Lawrence Erlbaum Associates.

- Hall, J. A., S. A. Andrzejewski, and J. E. Yopchick 2009. Psychosocial correlates of interpersonal sensitivity: A meta-analysis. *Journal of Nonverbal Behavior* 33: 149–180.
- Hall, J. A., D. C. Blanch, T. G. Horgan, N. A. Murphy, J. C. Rosip, and M. Schmid Mast 2009. Motivation and interpersonal sensitivity: Does it matter? *Motivation and Emotion* 33: 291–302.
- Harker, L. and D. Keltner 2001. Expressions of positive emotion in women's college yearbook pictures and their relationship to personality and life outcomes across adulthood. *Journal of Personality and Social Psychology* 80: 112–124.
- Harris, P. L. 1995. Children's awareness and lack of awareness of mind and emotion. In: D. Cicchetti and S. Toth (eds.), *Rochester Symposium on Developmental Psychopathology: Vol. 6. Emotion, Cognition, and Representation*, 35–57. Rochester, NY: University of Rochester Press.
- Harvey, J. H. and A. L. Weber 2002. *Odyssey of the Heart: Close Relationships in the 21st Century*. Mahwah, NJ: Lawrence Erlbaum Associates.
- Heyman, R. E., A. N. Hunt-Marorano, J. Malik, and A. M. S. Slep 2009. Desired change in couples: Gender differences and effects on communication. *Journal of Family Psychology* 23: 474–484.
- Horgan, T. G. and J. L. Smith 2006. Interpersonal reasons for interpersonal perceptions: Gender-incongruent purpose goals and nonverbal judgment accuracy. *Journal of Nonverbal Behavior* 30: 127–140.
- Johnson, D. J. and H. R. Myklebust 1967. *Learning Disabilities: Educational Principles and Practices*. New York: Gruen and Stratton.
- Kierkegaard, S. 1996. *Kierkegaard Papers and Journals, Translated by Alastair Hannay*, (1996). London: Penguin.
- Knapp, M. L. and J. A. Hall 2010. *Nonverbal Communication in Human Interaction*. 7th ed. Belmont, CA: Wadsworth.
- Kruger, A. C., A. M. Ambrosino, and L. A. Kapsch 2007. April *Enhancing communication and school adjustment in low-income Kindergarten children through drama in the classroom*. Paper presented to the Society for Research in Child Development, Boston, MA.
- Lerner, M. D. and K. Levine 2007. The Spotlight Program: An integrative approach to teaching social pragmatics using dramatic principles and techniques. *The Journal of Developmental Processes* 2: 91–102.
- Levinson, D. J. 1978. *The Seasons of a Man's Life*. New York: Knopf.
- Levinson, D. J. 1996. *The Seasons of a Woman's Life*. New York: Knopf.
- Matsumoto, D., J. LeRoux, C. Wilson-Cohen, J. Raroque, K. Kooken, P. Ekman, N. Yrizarry, S. Loewinger, H. Uchida, A. Yee, L. Albert, and A. Goh 2000. A new test to measure emotion recognition ability: Matsumoto and Ekman's Japanese and Caucasian Brief Affect Recognition Test (JACBART). *Journal of Nonverbal Behavior* 24: 179–209.
- Minskoff, E. H. 1980a. Teaching approach for developing nonverbal communication skills in students with social perception deficits: Part I. The basic approach and body language clues. *Journal of Learning Disabilities* 13: 118–124.
- Minskoff, E. H. 1980b. Teaching approach for developing nonverbal communication skills in students with social perception deficits: Part II. Proxemic, vocalic, and artifactual Cues. *Journal of Learning Disabilities* 13: 124–131.
- Mayer, J. D., R. D. Roberts, and S. G. Barsade 2008. Emerging research in the field of emotional intelligence. *Annual Review of Psychology* 58: 507–536.
- McClure, E. B. and S. Nowicki 2001. Associations between social anxiety and nonverbal processing skill in preadolescent boys and girls. *Journal of Nonverbal Behavior* 25: 3–19.
- Mehrabian, A. 1968. Communication without words. *Psychology Today* 2: 53.
- Melfsen, S. and I. Florin 2002. Do socially anxious children show deficits in classifying facial expressions of emotions? *Journal of Nonverbal Behavior* 26: 109–126.

- Murphy, N. A. and J. A. Hall 2011. Intelligence and interpersonal sensitivity: A meta-analysis. *Intelligence* 30: 54–63.
- Muthen, L. K. and B. O. Muthen 2006. *Mplus user's guide version 4.1*. Los Angeles, CA: Muthen & Muthen.
- Nowicki, S. 2011. *Manual for the receptive tests of diagnosis analysis of nonverbal accuracy 2 (DANVA2)*. Department of Psychology, Emory University.
- Nowicki, S., Jr., and J. Carton 1993. The measurement of emotional intensity from facial expressions: The DANVA FACES 2. *Journal of Social Psychology* 133: 749–750.
- Nowicki, S. and E. Carton 1997. The relation of nonverbal processing ability of faces and voices and children's feelings of depression and competence. *The Journal of Genetic Psychology* 158: 357–363.
- Nowicki, S. and M. P. Duke 1994. Individual differences in nonverbal communication of affect. The Diagnostic Analysis of Nonverbal Accuracy Scale. *Journal of Nonverbal Behavior* 18: 9–36.
- Nowicki, S. and M. P. Duke 2002. *Will I Ever Fit In?* New York: The Free Press.
- Nowicki, S., M. P. Duke, and A. van Buren 2008. *Starting Kids Out Right*. Atlanta: Peachtree Publishers.
- Nowicki, S., D. Glanville, and A. Demertzis 1998. A test of the ability to recognize emotion in the facial expressions of African-American adults. *Journal of Black Psychology* 24: 335–350.
- Pedhazuer, L. P. and E. J. Schmelkin 1991. *Measurement, Design, and Analysis: An Integrated Approach*. Hillsdale, NJ: Lawrence Erlbaum Associates.
- Pitterman, H. and S. Nowicki 2004. A test of the ability to identify emotion in human standing and sitting postures: The Diagnostic Analysis of Nonverbal Accuracy2 posture test (DANVA-POS). *Genetic, Social and General Psychology Monographs* 130: 146–162.
- Radice-Neumann, D., B. Zupan, M. Tomita, and B. Willer 2009. Training emotional processing in persons with brain injury. *Journal of Head Trauma Rehabilitation* 5: 313–323.
- Ransom, A. R. and S. Nowicki 2007. March *The systematic misattribution of receptive and expressive nonverbal emotion in children with externalizing disorders*. Poster presented at the biennial meeting of the Society of Research in Children Development, Boston, MA.
- Regan, P. 2011. *Close Relationships*. New York: Routledge.
- Reis, H. T., M. S. Clark, and J. G. Holmes 2004. Perceived partner responsiveness as an organizing construct in the study of intimacy and closeness. In: D. J. Mashek and A. Aron (eds.), *Handbook of Closeness and Intimacy*, 201–225. Mahwah, NJ: Lawrence Erlbaum Associates.
- Rhoades, G. K., S. M. Stanley, and H. J. Markman 2010. Should I stay or should I go? Predicting dating relationship stability from four aspects of commitment. *Journal of Family Psychology* 24: 543–550.
- Riggio, R. E. 1986. Assessment of basic social skills. *Journal of Personality and Social Psychology* 31: 649–660.
- Riggio, R. 1992. Social interaction skills and nonverbal behavior. In: R. S. Feldman (ed.), *Applications of Nonverbal Theories and Research*, 3–59. Hillsdale, NJ: Lawrence Erlbaum Associates.
- Rosenthal, R., J. A. Hall, M. R. DiMatteo, P. L. Rogers, and D. Archer 1979. *Sensitivity to Nonverbal Communication: The PONS Test*. Baltimore: The John Hopkins University Press.
- Rothman, A. D. and S. Nowicki 2004. A measure of the ability to identify emotion in children's tone of voice. *Journal of Nonverbal Behavior* 28: 67–92.
- Rothman, M. and S. Nowicki 2010. Predicting interpersonal attraction as a result of group interactions from the ability to identify emotion in nonverbal stimuli. Unpublished paper, Department of Psychology, Emory University, Atlanta, Georgia.
- Russell, J. A. 1994. Is there universal recognition of emotion from facial expression? A review of cross-cultural studies. *Psychological Bulletin* 115: 102–141.

- Saarni, C. 1999. *The Development of Emotional Competence*. New York: Guilford.
- Selfhout, M., J. Denissen, S. Branje, and W. Meeus 2009. In the eye of the beholder: Perceived, actual, and peer-rated similarity in personality, communication and friendship intensity during the acquaintance process. *Journal of Personality and Social Psychology* 96: 1152–1165.
- Shen, S. A. 1997. *Situational determinants of the ability to identify emotions in faces*. Unpublished doctoral dissertation, Department of Psychology, Emory University, Atlanta, Georgia.
- Skwerer, D. P., S. Faja, C. Schofield, A. Verbalis, and H. Tager-Flusberg in press. Perceiving facial and vocal expression of emotion in Williams Syndrome. *American Journal of Mental Retardation*.
- Stevens, D., T. Charman, and R. J. R. Blair 2001. Recognition of emotion in facial expressions and vocal tones in children with psychopathic tendencies. *Journal of Genetic Psychology* 162: 201–211.
- Sullivan, H. S. 1953. *The Interpersonal Theory of Psychiatry*. New York: Norton.
- Tolhuizen, J. H. 1989. Communication strategies for intensifying dating relationships: Identification, use, and structure. *Journal of Social and Personal Relationships* 6: 413–434.
- Tracy, J. L. and R. W. Robins 2008. The automaticity of emotion recognition. *Emotion* 8 (1): 81–95.
- Tseng, H., S. Chen, and Y. Huang 2009. *The Diagnostic Analysis of Nonverbal Accuracy 2 – Taiwan version: A computerized dual-channel instrument of nonverbal emotion recognition*. Taiwan University, Taiwan.
- Van Beek, Y. and J. S. Dubas 2008. Decoding basic and non-basic facial expressions and depressive symptoms in late childhood and adolescence, *Journal of Nonverbal Behavior* 32: 54–63.
- Walker, A. and S. Nowicki in press. Errors in identifying emotion in facial expressions, voices, and postures and in expressing emotion in facial expressions and voices unique to social anxiety. *Journal of Genetic Psychology*.
- Walker-Andrews, A. S. 1997. Infants' perception of expressive behaviors: Differentiation of multimodal information. *Psychological Bulletin* 121: 1–20.
- Wickline, V. B., W. Bailey, and S. Nowicki 2009. Hearing a difference: In-group advantage across cultures in vocal expressions of emotion. *Journal of Genetic Psychology* 170: 5–29.
- Wickline, V. B., A. M. Bollini, S. Nowicki, and E. F. Walker 2011. Emotion recognition in adolescents with schizotypal personality disorder. *Journal of Nonverbal Behavior (in press)*.
- Wickline, V. B., W. Bailey, and S. Nowicki 2009. Hearing a difference: In-group advantage across cultures in vocal expressions of emotion. *Journal of Genetic Psychology* 170: 5–29.