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Proxemics, Kinesics, and Gaze

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Proxemics

Kinesics

Gaze

Introduction

Chapter Orientation

This chapter is focused on the methodologies for coding behaviors in proxemics, kinesics (i.e., body and head movements), and gaze. Working definitions for these three domains are: 1) proxemics is the study of our perception and structuring of interpersonal and environmental space, 2) kinesics refers to actions and positions of the body, head, and limbs, and 3) gaze involves movements and direction of the eyes in visual interaction. In this chapter kinesics is synonymous with body/head movement.

For proxemics and gaze, the basic methodological design and behavioral coding strategies seem to have changed little since the early 1980s, and will be detailed in the chapter sections. Following upon the heels of the preceding chapters for coding facial actions and vocal behavior, the lack of development in codes and strategies for recording body movement is readily apparent. Although systematic research on kinesics began in earnest more than a half century ago, investigations have been of a piecemeal nature with a range of foci and methodologies developed in a variety of laboratories and conducted by researchers from a sweep of disciplines (e.g., psychology, communication, sociolinguistics, psychoanalysis). This unfortunately has resulted in a lack of coordination and state of disjointedness with respect to the development of a set of defined behavioral units for coding, comparable research methodologies, and theoretical constructs as a framework for understanding body movement. The present discussion of methodological issues in body movement research is divided into two segments: body positions and body actions. Each of these subsections includes historical information on the research strategies that evolved which may help provide a perspective to understand

the current state of methodological and theoretical development in coding body movement, proxemics, and gaze.

The chapter will begin with some general conceptual issues and factors affecting coding decisions, and points to consider in choosing a methodological strategy and behavioral units for coding movement. The methodologies for proxemics and kinesics will follow, and coding for gaze behavior closes the chapter.

Feasibility of Coding Body Movement

Humans, whether in individual or interactive settings, display a rich mosaic of actions, gestures, and postures with their bodies. This fact becomes immediately apparent when one sets out to code body movement. The number of actions and positions, speed in change of actions, versatility and subtlety of movement, individual variability of actions and positions, and interactive quality of the actions and positions themselves could easily be intimidating and lead to coder despair at ever being able to "get a grip" on describing, tallying, and analyzing body actions. Coding, however, is manageable because of some specifics about body movement. There are three key features that make coding body movement feasible given the varied number of moveable body parts and intricacies of combined movements.

Modest number of moveable body parts. An advantage in coding body movement that helps reduce the intricacy of coding is that the "body tableau", while vast in the sheer number of millimeters (e.g., compared with the face), is comprised of only a few moveable parts. The legs, arms, and trunk are primarily involved in movements for positioning the body. The upper arms, forearms, thighs, or calves cannot be moved individually. The shoulders, elbows, and knees can be moved and such movements may

be relevant to affect, but with the exception of shoulder shrugging, elbows and knees typically are moved as part of an arm or leg movement. All of these body parts may be of interest in studies of walking or approach, but generally it is the appendages of the limbs which garner attention in social encounters and settings where affect expression is likely. The two body parts that involve the most movement are the head and hands and, these have received the most attention in body movement research.

Behavioral repertoire limitations. Of the many possible actions and positions that can be performed by the body anatomically speaking, some actions rarely, if ever, occur. For example, it would be very unusual for someone to converse with another interactant while leaning his/her trunk in an extreme backward position, or for a person to display nonstop hand gestures when listening. Social conventions, "display rules" (Ekman, 1972), guide our behavior by the exercise of culturally learned rules that govern "…when it is appropriate to express an emotion and to whom one can reveal one's feelings (Ekman & Rosenberg, 1997, p. 10)." Behaviors that are exhibited outside the expected presentation of oneself usually are so atypical as to be diagnostic with respect to mental or emotional stability, or level of intellectual functioning. Goffman (1959, 1963) wrote eloquently about his observations of acceptable nonverbal behavior in various public and private social encounters, i.e., staff meetings, sidewalk maneuvers, ceremonial gatherings, and waiting areas.

Cooccurrence of behaviors. Another feature of body movement that mitigates the complexity of coding is that body movements often are displayed together. Movements can occur simultaneously (e.g., repositioning the trunk and legs) or in sequence (e.g., hand and head movements in speaker turn-exchange), and many complement facial (e.g.,

smiling and head nodding) and vocal behaviors (e.g., angry vocal tone and hands clenched). Movements which have a temporal relationship to one another allow for ease in coding because two movements are visually easier for a coder to observe than one behavior, thus reducing "omission" errors (i.e., not coding a behavior that occurred). In addition, temporally occurring movements often provide information regarding functional aspects of movement patterns.

Comparisons of Nonverbal and Verbal Behavior Codes

Prior to setting out to code body movement, several points need be considered when deciding what movements to code and how to code them. These ideas were first detailed by Ekman and Friesen (1969a) in an early article on coding nonverbal behavior, and have been mentioned frequently by others when discussing nonverbal behavior coding (Knapp & Hall, 1992; Rosenfeld, 1987). Several of these issues deal with drawing parallels between nonverbal and verbal communication.

Correspondence between behavior and meaning. Body movements cannot be translated as directly as verbal behavior. A word has a specific, defined meaning that always, and for everyone who knows the word represents that meaning, and by itself the word bears no relationship to its referent, (see Scherer & Ekman, Appendix I, this volume). Although several pop-psych books, written in the 1970s, continue to have wide audience appeal, the premise of these books does a disservice to the field of nonverbal behavior research. Books such as *Body Language* (Fast, 1970), *H*ow *To Read A Person Like A Book* (Nierenberg & Calero, 1971), *People Reading* (Beier & Valens, 1975), and *The Body Language of Sex, Power, and Aggression* (Fast, 1977) assume that various body actions and positions represent specific information when they are displayed (i.e.,

encoded) and that the meaning of these body actions are encoded and decoded (i.e., interpreted) unequivocally. Unlike certain facial expressions, there are few, if any, body movements that have invariant meaning within or across cultures. Some hand and head actions (e.g., shrugging, various insulting hand movements, head nodding) can be interpreted in a language-like fashion by individuals within a culture, and between cultures who are knowledgeable about each other's nonverbal behaviors, but even within a culture body movements do not carry the same meaning each and every time they are displayed. For example, one could head nod to signal *Yes* to a question, or nod as one of several listener responses to a speaker; the latter does not indicate assent, but only that the listener is following the speaker's comments. Birdwhistell (1970), for one, mentioned several kinds of head nods (e.g., "understanding nod", "control nod"); Giges (1975) referred to types of nodding by the "rescue nodder", "put-down nodder", etc. Further, a person might fold her arms across her chest when standing not to indicate a 'lack of approachability', but rather to increase body warmth in a cool environment (Raja & Nicol, 1997), or because of having no place to put her hands (e.g., pockets). Although one can indicate assent with head nodding or halt another with certain hand gestures, these actions are not always encoded or decoded universally. Many of the actions of the hands and body are so idiosyncratic as to carry little specific meaning.

Intention and behavioral displays. The issue of encoding and decoding nonverbal behavior for the purpose of conveying information involves not just the 'code' (i.e., actions conveying messages), but also the notion of 'intention' (Dittman, 1987; Ekman & Friesen, 1969a). In verbal communication, there is a deliberate attempt to send a message to another. Although there are times when one blurts out or emits an unintended

verbalization, most often the speaker consciously produces a verbal message for the purpose of exchanging information with another. This is not to suggest that verbalizations are always completely planned and thought out in advance, but relatively speaking that is usually the case, i.e., one thinks about what one wants to say. With nonverbal behavior the notion of intention is less clear-cut. A person might nod to answer a question or put a vertical index finger to the lips to shush a child, and both actions are thought to be intentional, deliberate attempts to communicate with another. But consider the degree of "intention" when a person gradually creates greater distance from an interlocutor by pulling back from a forward lean and turning slightly to the side while recrossing the legs away from the interlocutor. Similarly, there may be little or no "intention" when a person inadvertently rubs his/her hands while being interviewed for a desired job, exhibits a hand gesture when speaking, scratches the chin when thinking about a problem, nods when listening to another, or rearranges hair or clothing when flirting. While these behaviors might provide information to an observer, none of these may have been performed "intentionally." Thus, the encoding of nonverbal behaviors may range from conscious, deliberate messages to actions performed more automatically without awareness and with far less control (Dittman, 1987).

Idiosyncratic and shared meanings. Ekman and Friesen (1969a) distinguished between the idiosyncratic or shared meaning of behaviors with the former referring to a behavior peculiar to a single individual, and the latter, a behavior whose meaning is common to a set of persons (Ekman & Friesen, 1969a, p. 54). It is not the action itself that is idiosyncratic or shared, but the meaning attributed to it. These idiosyncratic and shared meanings can refer to encoders or decoders, e.g., idiosyncratic chin scratching

versus a hand wave in greeting. These authors further note that nonverbal behavior can be "informative" with shared decoded meaning among some set of observers, who may or may not be inaccurate in their decoding of meaning, and when the encoder may not have necessarily intended to convey a message via their nonverbal behavior. A behavior may be "communicative" in which case it is consciously sent by an encoder to another person, although it may not be accurately conveyed or interpreted. Lastly, Ekman and Friesen (1969a) classified nonverbal behaviors as interactive where the encoder's behavior influences the interactive behavior of another whether intended or not (p.56). Thus, an informative act might be fidgeting when apprehensive, or waving *Hello*; a communicative act might be nodding to indicate *Yes*, or using a hand gesture to signal *Come here* that is not understood by the decoder; and an interactive behavior could include nodding when listening to a speaker, or restless posture shifts suggesting boredom when listening.

Avoiding behavioral terminology bias. A important point when deciding what movements to code is that just as with coding facial actions, the terminology for the measures selected for coding body actions and positions, as much as possible, needs to be descriptive, rather than inferential. This is critical in preventing bias associated with inferred meaning based on terminology. For example, describing a leg posture as "open" may carry the implied meaning that the person is receptive or accessible, rather than merely sitting with uncrossed legs. A hand movement labeled as a "suppressed movement" may be characterized more descriptively as "one hand placed on the other hand." Referring to a head nod as a "positive nod" and a head shake as a "negative nod" carries considerable inference about the behavior coded.

Key Concepts in Coding Body Movement

The body and affective content. While there are specific emotion universals for facial actions (see Cohn & Ekman, this volume) and vocal behaviors (see Juslin & Scherer, this volume), body movements alone do not convey specific emotion content. A clenched fist by itself does not necessarily convey anger, nor do insulting hand motions, or a shaking head. Body actions can provide information regarding the intensity of the felt emotion (Dittman, 1987; Ekman & Friesen, 1974), and together with facial actions and vocal cues can accent or emphasize affect, but it is primarily the face and voice that carry specific affect. Body positioning offers information about attitude, status, interpersonal role, motives, and personality characteristics of the encoder, and reveals perceptions of decoders. To some extent, the body's positions and actions provide a backdrop for helping to interpret the meaning of more subtle facial and vocal affect.

Moderator variables. Since body movements tend to be more idiosyncratic and culture-bound, one caveat that may be more applicable in coding body movements than in coding facial or vocal behavior is the important moderating effects of gender and culture, and to a lesser degree, age, in the display and interpretation of many body actions and positions. Some examples are: 1) the greater frequency of eye blinking by females compared with males, 2) the hand gesture for *Come here* in the United States compared with the gesture in Italy, or 3) the closer seating proximity for young children versus middle-aged adults.

Theoretical orientation. A important point to consider when deciding on a coding strategy for body movement parallels a dichotomy suggested between "structural" (i.e.,

concerned with movement/vocal patterns within and between people) and "external variable" studies (i.e., concerned with nonverbal behaviors in relation to other variables such as personality, role, other nonverbal behaviors) (Duncan, 1969). As Ekman et al. (see Scherer & Ekman, Appendix I, this volume) indicated earlier, this distinction may be artificial and irrelevant because the choice of methodologies is driven by the type of data needed to support the answers to the researcher's questions. When examining body movement, the researcher can opt to quantify body positions, body actions, or both, and be selective or comprehensive in coding individual movements, or code at a micro versus macro level of analysis. But the research questions will determine whether one is to code movements at a micro level of analysis in a comprehensive fashion using a structural approach, to code movements at a macro level of analysis in a selective fashion using an external variable approach, or to code using some combination of approaches. The former would be highly appropriate for the study of body movement in relation to specific elements in speech (e.g., relating the placement of a hand gesture occurring concurrently with specific content in the speech stream). The latter might be more useful for a comparison of "friendly" versus "unfriendly" interviewer styles where data are collected on the frequencies of head nodding, smiling, hand gestures, forward lean, etc. Finally, a researcher can decide to combine various nonverbal actions into conceptual categories together with verbal behavior (e.g., angry words, facial action units indicating anger, hands in fists, body tense, etc.) (see Giese-Davis, Piemme, Dillon, & Twirbutt; Yoshimoto, Shapiro, O'Brien, & Gottman, both this volume).

Each of the points described above need to be thoughtfully considered before the investigator chooses the research approach, level of analysis, comprehensiveness of coding, selection of and naming of nonverbal variables, and data analytic methods.

Proxemics

What is it and How is it Measured?

In proxemic research, the focus of attention is on the perception, use, and structuring of space. Although an individual's behavior may be of interest with respect to spatial arrangements in the nonhuman environment, most often we study how spatial use affects and reflects relationships between and among individuals as a member of a dyad or larger group and whether it is intentional (i.e., seeking interaction) or inadvertent (i.e., in public settings). Most research efforts and, therefore, methodologies, have been concerned with interactional settings. For example, we may want to know how people position themselves in a conversational setting with friends, intimates, or strangers. Perhaps we want to know something about the use of space in business, health, or educational settings to answer questions regarding employee engagement in task-focused groups, family members' orientations to one another in psychotherapy, physician-patient consultation styles, or effective teacher-student instruction.

The literature on proxemics and how it is described or measured, overwhelmingly indicates that the 'distance' between interactants was coded most often. While distance is an important variable in proxemics, it is a limited and unsophisticated measure of the factors that make up the invisible, yet precious, three-dimensional space that separates us from one another. Hall (1963, 1973), whose work will be detailed below, takes a

comprehensive view of our spatial relationships to one another and to the nonhuman environment. His view reflects an interactive approach which emphasizes the distance-regulating features of our sensory equipment, as well as body orientation, to describe our interface with others. His coding variables are listed in Figure 4.1, and can be summarized as including: distance, postural identifiers (i.e., sitting, standing, etc.), orientation of frontal body plane (i.e., degree one faces another), and input from the senses of touch, vision, audition, olfaction, and temperature (i.e., perceiving heat from another's body).

(Insert Figure 4.1 about here)

Research Approaches

As the brief historical overview of research strategies which follows will reveal, there are two main techniques for conducting proxemic studies: projective strategies, and laboratory or field studies. Projective strategies are the most common (Aiello, 1987), representing approximately 40% of studies. There are several measures used in projective strategies, but all require that participants imagine the distance at which they would be comfortable with their choice of seating position in relation to another interactant or with another's approach toward them. Such techniques require marking placements on a form (Comfort Interpersonal Distance Scale; Duke & Nowinckis, 1972), manipulating miniature figures, or choosing positions in photographs. Kuethe (1962) used felt figures and Pedersen (1973) adopted silhouette placements of figures to indicate seating, standing, and approach preferences. Hayduk (1983) and Aiello (1987) both have argued strongly against the use of projective techniques to measure personal space because of poor correlations between projective and real-life interactional studies, and the fact that

the scaled down projective figures do not parallel life-size differences. These difficulties are particularly apparent in studies of approach, i.e., effects of a person entering one's spatial comfort zone.

The second type of proxemic study involves interactions in naturalistic field settings or laboratories. For Hall's (1974) qualitative observations, unobtrusive use of a camera was "indispensable", permitting re-examination of behavior between interactants with respect to distance cues. Videotape records with features of slow motion and digital counters permit greater accuracy in determining distance. Scherer (1974) developed a technique, photogrammetry, which involves a mathematical formula to remove errors in coding distance resulting from the angle of the participants with respect to the camera. Thus, this technique permits greater accuracy in coding distance from videotaped or filmed interactions. Edmonson and Han (1983) marked the floor tiles with tape making a grid which permitted precise measurement of videotaped participants engaged in various activities. Their camera was perched high above the participants for better alignment and so as not to interfere with the participants' interactions. The latter suggests an important strategy for measuring distance accurately, ceiling positioned cameras. In the future perhaps such instrumentation as global positioning devices might be used to record distance as well as other proxemic variables.

Proxemic Measures

The degree to which proxemics was the main focus of study determined which variables were included. These are few and typically, distance, frontal body orientation, touch, and gaze were measured. In studies where proxemics was less of a focal point, only distance, and, more rarely, orientation, was ascertained. At first glance, distance

appears to be a straightforward variable to measure, but a variety of different reference points have been used to represent the 'distance' between interactants: measured from their heads, noses, knees, torsos, feet, or chair edges. Sometimes the number of floor tiles between interactants was counted, and floor tile size also varied widely. Of course, these measures differ greatly depending on whether interactants were standing or sitting. Coders have been trained to estimate the distance rather than interrupt the interaction to measure. Often the actual method of measuring and instrumentation was unstated. The lack of uniformity and specificity of measurement makes it difficult to compare research findings across studies.

In some studies where the independent variable was another interactant's gender, age, culture, personality characteristic (e.g., friendliness, dominance, inconsistency), or some other feature (e.g., physical disability, criminality), distance was measured by the seat chosen by the participant or distance he/she approached another participant. For example, Weitz (1972) found that participants' chair placement reflected their attitudes toward someone of a different race. In other studies, the participant's chair was positioned so that it could not be moved, and researchers manipulated the distance of a confederate (e.g., seated close or far) with respect to the participant.

A large body of work has been conducted in proxemic research on approach distance (considered below). For example, Mehrabian (1968) asked participants to approach a coatrack as if it were a person, stopping at the point where they felt comfortable interacting with that "person."

Research Overview

A brief historical overview within the areas of proxemic research may help the reader understand the development of this field and measures used to study it.

Person to person. The appropriate starting point for proxemics is the work of the insightful anthropologist, Edward T. Hall, (1963) who first used the label "proxemics." Using naturalistic methods, and based on his extensive observations of humans' use of space, attention to cultural differences, and the evidence from animal behavior with specific reference to crowding and territorality, Hall (1963; 1973) developed a notation system of personal distance that has become the foundation of measurement in proxemics. Hall's ideas and theory were greatly influenced by the ethologist, Hediger (1961), whose work in zoology and animal behavior focused on the sensory worlds of the interactants in relation to personal distance.

Hall (1963) divided our spatial world into four social distances, each with a close and far phase, and each based on varying information available from vision, audition, olfaction, thermal reception, and kinesthesia (i.e., sensation of physical alignment of head/body). These four social distances (i.e., intimate, personal, social/consultive, and public) span zero to 30 feet, and vary according to type of interaction, and the status of and affiliation between interactants. Although, Hall did not ascribe precise quantitative values to the codes in his notation system, he described in intricate detail the various nonverbal and vocal cues available to our distance and immediate sensory receptors (see Figure 4.1). For example, mothers and infants frequently inhabit the close phase of the intimate distance, zero to 18 inches, where they can easily touch, smell, feel body heat of, and hear faint sounds (i.e., grunts, coos) of their interactant, though such closeness limits vision to a blurred or distorted view of the other. More specifically, one of Hall's codes

(1973) considered under “kinesthesia” is body orientation which ranges from sitting back to back, sitting side by side, and sitting at right angles to facing each other. Likewise, the body distance code ranges from two people leaning out of reach of one another through “two arms extended” toward each other to “maximum body contact.”

Hall (1966) acknowledged the approximate nature of these distance zones, commenting on variations resulting from the influence of personality or environmental factors. In their extensive review, Altman and Vinsel (1977) concluded that Hall’s “qualitative ideas” regarding distance zones to describe human spatial behavior were supported by research findings, although they acknowledged differences in these distance dimensions for standing and sitting.

Watson and Graves (1966) created a scoring system with a range of scores to operationalize seven of the eight dimension codes described by Hall (1963; 1973): frontal body orientation, distance, touch, visual clarity, thermal detection, olfaction, and vocal loudness; postural identifiers (i.e., standing, sitting, etc.) were uniform. For example, touch was coded from “holding and caressing” (0) through “spot touching” (4) to no contact (6). Their results showed that compared with American college students, Arab students interacted more closely on all dimensions and the authors were able to pinpoint precisely these differences for all seven dimensions (Watson & Graves, 1966). Other measures for coding the distance between interactants exist. Jones and Aiello’s (1973) measure is based on the ability to reach out and touch another, and the measure contains adjustments for height differences as well. Sigelman and Adams (1990) used a scaled map in a naturalistic observational study to plot the distance between parents and their children.

Person in environment. In his writings, Hall (1966, 1974) also commented on how space is organized in a community and the effect these patterns have on communication. Spaces reflect environmental arrangements (e.g., furniture, architecture) that encourage or promote communication (i.e., sociopetal space), or provide for solitary actions (i.e., sociofugal space). Systematic studies of spatial arrangements in social interaction were investigated extensively by Sommer who was interested in how people arranged themselves in "semi-fixed" space with respect to concepts of leadership, status, productivity, and affiliation (Sommer, 1959, 1961: Sommer & Becker, 1969). He defined "personal space" as "an area with invisible boundaries surrounding a person's body into which intruders may not come (Sommer, 1969, p. 26)." Sommer reported four distinct patterns for "relational space" depending on the type of task: conversational, cooperative, competitive, or coacting. Others have supported Sommer's results, finding, for example, that those of higher status tend to occupy end positions at a rectangular table, where they participated more, were rated as more influential, and received more gaze from other participants (Strodtbeck and Hook, 1961).

Approaching others. A popular focus in proxemic research has been approach distance, most often measured by the "stop-distance procedure" in which a participant signals, "stop", to indicate their level of discomfort with respect to an approaching experimenter or confederate (Hayduk, 1983). Aiello (1987) reports more than 100 studies using this procedure. Hayduk (1981a, b) altered the angle of approach, and Aiello and colleagues investigated seat preference with respect to distance from interactants (Aiello & Jones, 1971; Aiello & Thompson, 1980).

Responses to encroachment. Other phenomena are important in proxemic research, though these are not often fully operationalized or clearly measured: territoriality, defense, crowding, boundary markers, and similar topics involving maneuvering and maintaining personal space in public places. Goffman's (1963, 1971) elegant observations of people's behavior in public and the use of physical and social barriers to maintain some degree of psychological privacy in public settings (i.e., "civil inattention"), are eloquent and insightful, but are not precise or cue-specific in terms of measuring the phenomenon.

The concept of crowding is defined not entirely by population density, but also with respect to other relevant variables: time spent in the area, interaction expectancies, focus of attention on self or others (Zlutnick & Altman, 1972), degree of social stimulation (Desor, 1972), gender, and room size (Ross, Layton, Erickson, & Schopler, 1973). Stokols (1972) defined "social density" as the physical spacing between people that is related to the number of people, "spatial density" as physical spacing related to the amount of space available to people, and "crowding" as a negative psychological state related to dense spaces. Hayduk (1981a) conducted the most detailed study of "permeability", or reaction to intrusions, concluding that the "degree of discomfort was proportional to the extent of intrusion (p. 284)."

Altman has made significant contributions in his work on crowding, territoriality, and interpersonal relations (Altman, 1975; Altman & Taylor, 1973; Sundstrom and Altman, 1976). He delineated three types of territories: primary, secondary, and public (Altman, 1975), and described various ways people maintain some degree of privacy through the use of physical barriers, place markers, and adjustments in verbal and

nonverbal behavior to discourage interaction. Similarly, Lyman and Scott (1967) developed a classification system for various territories based on the degree of personal autonomy (i.e., body, home, interactional, and public), and outlined categories of territorial incursion (i.e., violation, invasion, and contamination). Applying the defining features of these territories to real life settings has not proved to be straightforward, however. The lines defining interactional and public, and secondary and public territories often are fuzzy, with considerable overlap depending on critical variables such as density, use of boundary markers, status, degree of acquaintanceship, and other relevant factors. Sommer conducted a series of studies showing the effect of "markers" to defend one's personal space in a public setting, to reduce incursion by others, and to maintain one's possession of personal space while the owner was absent (Sommer, 1967, 1969; Sommer & Becker, 1969). His studies include greater precision than other researchers in defining markers, measuring distances between interactants, and categorizing the resulting behavior of the interactants.

Methodological Issues

Hayduk (1983) and Aiello (1987) provide thoughtful and comprehensive reviews of proxemic research, covering measures and methodological issues, theoretical interpretations, problem areas, and detailed findings with respect to spatial behavior and relevant factors: age, gender, culture, personality, relationship, environment, and intrusion or invasion. Aiello notes that like many subtopics in nonverbal behavior, researchers from many disciplines have studied personal space: Hall, Sommer and others consider the use of space from a naturalistic, observational viewpoint, and often psychologists and sociologists analyze the effects of empirical manipulations of proxemic

cues on participants, or the effects of another manipulated variable on participants' proxemic behavior. Aiello remedies a definitional problem, noted by others (Knowles, 1980; Patterson, 1975), by using the term "interpersonal space" which focuses on the communicative function, rather than the often used term, "personal space", which stresses the protective function. Researchers seeking specific results with respect to certain proxemic variables and relevant factors will benefit from Hayduk (1983) and Aiello's (1987) reviews of more than 700 studies. For future researchers, Hayduk (1983) and Aiello (1987) recommend the continued development of methods and measurement techniques, and research attention to gender and cultural differences in studies of spatial behavior.

Summary and Coding Recommendations

As the brief historical overview of research in proxemics shows, there have been few developments since Hall outlined his notation system (1963; 1973). A few coding suggestions can be culled from this literature. As in any other area of investigation, decisions about which proxemic variables to code depend on the research question(s). When proxemic patterns are of primary interest, it may be appropriate to use measures developed by Hall: postural identifiers, distance, orientation, touch, vision, audition, olfaction, and thermal detection. These variables permit a comprehensive and accurate assessment of spatial cues, but for each variable scores need to be assigned to each cue within a category to operationalize the range of possible cues (see Watson & Graves, 1966).When proxemic cues are secondary or tangential to the research question(s), distance, orientation, and touching may be sufficient to capture information regarding the spatial separation between interactants. For example, trained coders evaluated videotaped

interactions at several intervals by choosing one of: 1) eight possible distances between interactants' heads and torsos, 2) seven possible orientations for interactants toward one another, and 3) six possible types of touching (Remland, Jones, & Brinkman, 1995). In our research manual for interactions of two or more individuals, proxemic variables include: distance (based on floor tile markings), trunk lean and orientation, postural shifts, touch, and gaze (Harrigan & Carney, 2005).

Although Hall's proxemic system contains codes for gaze, audition, and touch, researchers also frequently include these as individual categories in studies where proxemic cues are coded. For example, Grahe and Bernieri (1999) rated the degree of mutual eye contact, in addition to proximity and orientation. While some proxemic cues such as distance and orientation can be separated more easily in some studies, the Intimacy Equilibrium Model presented by Argyle and colleagues (Argyle & Dean, 1965; Argyle & Cook, 1976) demonstrates the strong relationship between proximity and eye contact. This model will be discussed in detail in the section on gaze in this chapter.

Finally, body positional cues are alluded to in Hall's system under the code for estimating body distance, but are not considered as separate categories of proxemics. Body positional cues include trunk lean, and positions of the arms, legs, and head with respect to another interactant. These will be discussed in more detail in the following section on body position, but clearly, interactional space is greatly altered by these cues. For example, leaning toward another greatly reduces the distance between participants and makes one available for touching, mutual eye contact, olfaction, and thermal detection.

In summary, proxemic cues of importance for coding interactive behavior include: postural identification (i.e., sitting, standing), distance, frontal orientation, and body positioning. Depending on the research objectives, touch, eye contact, olfaction, and audition also may be coded. Considerable work needs to be accomplished in proxemic research to precisely define and operationalize scoring methods for proxemic cues. This will allow study results to be more easily compared and theoretical implications for these behaviors to be examined and understood.

Kinesics

Where the Action is

The predominant loci of attention in body movement research, "kinesics", has been on the hands and head, two areas with the greatest overall movement frequency. For body movements in general, and for the head and hands specifically, researchers' coding methods are varied, rarely well-defined, and with few exceptions, are not often organized conceptually or theoretically. Although kinesic research remains relatively embryonic, classifications and coding strategies will be presented using a historical, developmental approach to describe the various advances in body movement research.

Actions and positions

The evolution of methodological strategies for coding body movement has been focused primarily on "action" behaviors, i.e., discrete units of body action which are not part of body positioning, and which have relatively distinct "onset" (i.e., beginning of action) and "offset" (i.e., end of action) points, and which may or may not be intentional

or interpretable by others. These body actions are displayed by the head, shoulders, hands, and feet, and involve activities such as: head nodding, shrugging, gesturing, scratching, and kicking. These action behaviors are supported by "position" behaviors, i.e., movements associated with positioning the body, and which are less subject to frequent change and can be more easily codified. Like action behaviors, position behaviors usually are described in relation to another interactant and typically include reference to: overall posture (i.e., sitting, standing, lying), trunk or frontal orientation (i.e., facing, turned away), trunk lean (i.e., forward, straight, backward, sideways), and arm and leg positions (e.g., folded arms, uncrossed legs) which includes the feet (e.g., flat on floor, under chair, on other knee, etc.). Body actions often are considered expressive movements which may or may not be displayed, and usually have easily discernable beginning and end points. Body position, on the other hand, is always present and available for coding in the sense that a person's body is continually in a posture with torso, arms, and legs arranged in relation to one another. Body actions mainly involve the hand and head; their coding will be described following discussion of body positions.

With respect to all body movements, body positions are the largest units to code compared with body actions. Body positions involve the least variation from person to person, and change relatively infrequently. Because the individual body positions tend not to occur in isolation from one another, they often can be considered as a unit. For example, a shift in trunk lean or orientation usually affects the position of the arms and sometimes the legs. Similarly, a woman's folded arm position might be interpreted as indicating a "lack of approachability" if she also turned her body and head away, but any one of these actions alone would not be sufficient to warrant that same interpretation;

e.g., her folded arms could be an attempt to keep warm. The phenomenon of self-synchrony (described below) assumes the coordinated interaction of an individual's body positions and movements; likewise, interactional synchrony describes synchronous positions and movements between and among interactants.

In this chapter, the term body positions is used to represent the alignment of the body and its appendages, and includes such specific categories as trunk lean, trunk orientation, arm and leg position, and postural shifts. These behaviors provide information regarding one's attention, interest, and attitude, and may convey inferential or stereotypic information about the encoder's personality characteristics. For the most part, body positions carry little information about specific affect compared with face and voice cues (Ekman & Friesen, 1974). It is hard to imagine a positional cue that conveys a specific emotion on its own without the benefit of facial, head, or hand actions, but body position and alignment can provide information regarding the degree of tension an individual is experiencing and something of the intensity of an emotion (Ekman & Friesen, 1969a). Because body positioning deals with the placement of the body in space, it bridges the research areas of proxemics and body actions. Hall (1963) included many of the body position behaviors (i.e., frontal body orientation, postural identifiers, touching) in his coding system for describing the interpersonal space between interactants.

Early Coding Systems for Body Movement

A brief overview will help provide the reader with relevant information on research methodology that was developed prior to the earlier handbook (Scherer & Ekman, 1982) and up to the present time. This historical overview is not intended to be

wholly comprehensive, but to aide researchers in understanding the theoretical perspectives in body movement research and the development of strategies to code behavior based on such theories. This section will be followed by methods and techniques for coding body positions and actions.

Several creative coding systems were developed during the 1950s for recording body positions and actions. Most of these are based on anatomical features, and segmenting the body in relation to the skeletal system. Use of these strategies for coding nonverbal behavior generally has been abandoned because while the notation systems are comprehensive, a variety of problems forestall their use.

Labanotation (Hutchinson, 1961; Laban, 1956) is a movement notation system, designed specifically for dance, (thus the great attention to specific foot actions) and based on a theory of movement in the expression of dance. It is modeled after a musical notation system, and permits the construction of a record of the actions of various body parts over time. Symbols are used to show the quantitative and qualitative features of movement including direction, duration, and intensity, but precise measurement of smaller nonverbal acts (e.g., of fingers) is not possible. Since the symbols represent the actions or positions of the body, no inferences are necessary on the part of the coder. However, there are several coding challenges: (a) the large number of symbols to be learned, (b) the use of arbitrary symbols that are not intuitive, (c) locating symbols in the graph's frame is tedious, (d) the system is very time-consuming, and (e) the isolation of body movements precludes the communicative value of considering behaviors organized as a unit (e.g., pursed lips, averted gaze, crossed arms, less direct frontal body orientation).

(Insert Figure 4.2 about here)

Another coding method is the Eshkol-Wachmann (EWMN) system (Eshkol & Wachmann, 1958) detailed by Golani (1969). This notation system, also originally developed for dance, has been used for behavioral observations in human research and in animal studies. The system is based on a circle, and movements and postures are measured in units of 360 degrees permitting coding of a range of nonverbal behaviors in relation to one another. Again, like Labanotation, using numerical values in the EWMN system does not require subjective inferences in the various coding units, but similar challenges are incurred.

The Bernese system for coding nonverbal behavior was designed by Frey in his dissertation (1971) and further developed with von Cranach, and with Pool. This system purports to cover all possible spontaneous movements that occur when participants are seated, and includes the head, trunk, arms, hands, legs, and feet. The Bernese system is based on the principle of position-time-series-notation that assigns numerical codes to the various deviations of body parts from the base positions, e.g., a head tilt to the left and down is given a numerical value to represent the degree to which the head has deviated from the "normal" position which is upright and facing straight ahead. The system permits detailed, comprehensive, and reliable transcription of videotaped behavior into "high resolution data protocols." The Bernese system codes position and movement every 16 seconds (originally based on the 16 frame per second movie film) so as to represent "fluid movement" (Frey & Pool, 1976). The described positions are made with reference to the three Cartesian axes (horizontal, vertical, and depth), and can represent concepts such as expansiveness, reaching out, concordance, imitation, and others (Frey & von

Cranach, 1973; Frey & Pool, 1976). The Bernese spatiotemporal parameters cover all changes in movement from moment-to-moment, and since it avoids the use of psychological constructs labeled by the experimenter, it is considered less evaluative and subjective compared with other coding systems (Argyle, 1975; Ekman & Friesen, 1969a). The descriptive accuracy of this system was demonstrated in a study requiring coders trained in the Bernese system to draw models' positions from data protocols which had been developed from descriptions of the models' original positions; 98% of the positional codes were identical to the original (Frey & Pool, 1976). Bente and colleagues developed 3-D animation programs based on transcriptions of head positions using the Bernese system (Bente, 1989), and further, showed that observers' rated impressions of individuals in computer 3-D animations and original videotaped interactions were nearly identical (Bente, Kramer, Petersen, & DeRuiter, 2001).

Birdwhistell (1952; 1970), an anthropologist, was a pioneer in the study of body movement who was known for originating the structural or descriptive approach to studying body movement. He believed strongly in not drawing a distinction between verbal and nonverbal behavior in the study of human communication, and designed a notation system for describing the structure of movement that was patterned after linguistic principles. A 'kineme' is similar to a phoneme (i.e., smallest meaningful sound unit of speech), and represents the most elementary unit of behavior, while 'kinemorphs' (i.e., analogous to morphemes) are combinations of kinemes, and 'kinemorphic constructions' are still larger units of combined kinemorphs. For example, a kineme would be a lateral head sweep or a head tilt (Birdwhistell, 1970). Each kineme is depicted by a specific symbol entered onto a precise and complete verbal transcription. For

example, Birdwhistell's most famous analyzed film segment, "The Cigarette Scene", is an in-depth description of the 18 second segment isolated into the minute movements (i.e., kinemes) of the face, head, and body for each interactant together with the verbal stream. The analysis shows the relationship between the nonverbal and verbal behavior using Birdwhistell's (1970) descriptive linguistic model. A partial example of Birdwhistell's system is listed in Table 4.1 for the arm.

(Insert Table 4.1 about here)

Scheflen (1964; 1966), a psychiatrist, studied filmed therapist-client interviews, and like Birdwhistell, who greatly influenced him, described a hierarchy of behaviors within an interaction. "Points" correspond to the smallest units of behavior (e.g., head cock, hand gesture, facial grimace), while "positions" include speech utterances and actions that are linked as a configuration representing a theme (e.g., listening, defending, narrating), and lastly, "presentation" denotes a sustained interaction (e.g., a conversation; a therapy session) (Scheflen, 1966). Each of these three levels is marked by a change in movement or posture. For example, postural shifts often mark a change from one position to another and correspond to a change in interaction activities (e.g., from speaking to listening) (Scheflen, 1972). Scheflen, like Birdwhistell, stressed the importance of "context analysis" in understanding the subtle weaving of nonverbal and verbal behavior (Scheflen, 1965). He used a courtship movement analogy to describe the functional aspects of body movement in establishing rapport in any social interaction. For example, "courtship readiness" is displayed by "high muscle tonus" and "preening" actions, while the positioning phase of the interaction is represented by the alignment of each

interactants' body to the other, and actions of "appeal" appear throughout the interaction in gaze holding, "presenting the palm", and head tilting.

The research approach taken by both Birdwhistell and Scheflen in the study of body movement was a holistic one, advocating "context analysis" which stressed the importance of the context in understanding patterns of nonverbal behavior. This approach has often been referred to as the "natural history" method or structural approach to studying expressive behavior, and has been advocated by those in anthropology, linguistics, sociolinguistics, psychiatry, and other fields (Bateson, 1971; Hockett, 1971; Kendon, 1970; Kendon & Ferber, 1973; McQuown, 1971).

Context and Kinesics

At about the time that Birdwhistell and Scheflen were describing their findings and developing structural theories to explain the relationships among semantic content, body movement, and the social interaction function of body movement, other researchers, conducting systematic studies, noted precise, systematic relationships between speech and movement.

Nonverbal and verbal congruence. Boomer (1963), and with Dittman (Boomer & Dittman, 1964), investigated verbal-nonverbal congruence, determining units of speech and types of pauses, and the timing of body movements in relation to these. Boomer's (1965) work stimulated studies on speaker-listener turn exchange by focusing on the special relationships among certain body movements (e.g., of hand, head), vocal hesitations and pauses in speech (i.e., hesitation, juncture, filled), and the phonemic clause; i.e., unit of speech characterized by specific prosodic (i.e., intonation) patterns (Trager & Smith, 1957). This work began a series of studies by Dittman and Llewellyn

(1967, 1968) on the characteristics of speaker and listener behaviors in conversation. They reported on the precise placement of "listener responses" (i.e., acknowledgment responses such as head nods, and "M'hum") within speakers' utterances. Others corroborated these results (Duncan & Fiske, 1977; Matarazzo & Wiens, 1972; Rosenfeld, 1966, 1978; Rosenfeld & Hancks, 1980; Yngve, 1970). Dittman (1972) further elaborated speakers' frequent use of body actions ("fidgetiness") during non-fluent versus fluent speech. He posited a cognitive-speech relationship such that body movements facilitated speakers' utterance constructions, particularly during non-fluent hesitations, and suggested a possible neurological basis for this behavior. Dittman (1977) also described developmental patterns in conversational behavior.

At approximately the same time as Boomer and Dittman's work, others investigated the movement-speech relationship of individuals, and between individuals. Condon and Ogston (1966, 1967) first described "self-synchrony" as the correspondence between a person's body movements and his/her speech utterances at the phonemic, syllabic, and lexical levels. An example of self-synchrony is the display of a rhythmic hand gesture in tempo with the rhythm of one's speech. Condon and Ogston (1966, 1967) described "interactional synchrony", as the coordination between listeners' movements and speakers' utterances. Using frame-by-frame microanalysis of filmed sequences, they found that listener movements were patterned on the speaker's speech stream. Small movements of the listener's head, eyes, wrist, mouth, and fingers occurred at phoneme changes in the speaker's talk.

Kendon (1970) reported similar results and suggested that, even when the listener could not observe the speaker, the listener's precision in synchronized actions suggested

that the listener had anticipated the meaning of the speaker's utterance before the speaker finished talking. He further postulated that the listener's coordinated movements with the speaker's utterance reflected cognitive processes involved in processing speech, just as the synchronization between speaker's movements and speech reflected the speaker's cognitive processes in producing speech. This remarkable entrainment between speakers and listeners is present quite early in life as Condon and Sander (1974) showed in two week old infants whose movements were coordinated with the adults' speech, but not with non-speech sounds. Condon (1980, 1982) described problems in displays of synchrony in children with various developmental and learning disorders. Some of the functions served by synchrony are to: regulate speaker turn exchange (Dittman & Llewellyn, 1969; Duncan & Fiske, 1977; Hadar, Steiner, & Rose, 1985), reflect rapport (Scheflen, 1964; Tickle-Degnen & Rosenthal, 1987), and show attention and comprehension (Kendon, 1970). Studies on speaker-listener interaction require careful coordination of videotaped behaviors of each interactant and coding of each body movement at a micro level of analysis. This type of analysis requires meticulous inspection and coding, and precision in locating these movements in time and in relation to the other interactant.

While there has been criticism of Condon's method of measuring synchrony (McDowall, 1979: Rosenfeld, 1981), other researchers' work attests to the existence of the phenomenon (Davis, 1982; Kendon, 1972). A clever series of studies by Bernieri and colleagues avoided the earlier criticisms of the methodology of measuring synchrony, by using judges' ratings of synchrony (i.e., "simultaneous movement, tempo similarity, coordination, and postural sharing") for mother-infant and teacher-student dyads, in adult

conversations, and in full video versus mosaic segments (Bernieri, 1988; Bernieri, Davis, Rosenthal, & Knee, 1994). For a more thorough treatment of the theoretical, definitional and methodological issues regarding synchrony, consult the work of Bernieri and colleagues (Bernieri, Reznick, & Rosenthal, 1988; Bernieri & Rosenthal, 1991).

A companion notion to synchrony is postural or interpersonal congruence. Mehrabian (1972) suggested that the angle of postural lean (i.e., lean of the trunk forward, sideways, back, or straight) was highly related to interpersonal attitude and status. Scheflen, too, (1964, 1965) had noted that psychotherapy patients and therapists tended to match the alignment of their limb and trunk positioning, particularly when rapport was high. Trout and Rosenfeld (1980) showed that observers attributed "greater rapport to the congruent-limb episodes" compared with noncongruent segments. "Bookending" was used to refer to mirror image positions of individuals on either side of a person(s) sitting between them and suggests a close involvement of the individuals involved (Scheflen, 1972).

Channel studies. A popular approach to studying body movement has been channel studies in which information from various expression modalities (i.e., face, voice, body, verbal) is compared and contrasted (Bugental, Kaswan, & Love, 1970; Gallois & Callan, 1986; O'Sullivan, Ekman, Friesen, & Scherer, 1985; Rosenthal, Hall, DiMatteo, Rogers, & Archer, 1979). For example, Lessin and Jacob (1984) reported greater inconsistencies in verbal-nonverbal behavior patterns in interactions between parents and delinquent children compared with "normal" families.

Body Positions

This section will begin with a summary of research efforts to code and define body movements gleaned from investigations which include assessment of "body movement." To understand how investigators have coded body positions in research studies, a thorough perusal of the literature was conducted using PsycInfo of the SilverPlatter database computer search program. The terms used were body, trunk, or torso with posture, positioning, movement, lean, orientation, and postural shifts. A similar review was made for arm and for leg position, movement, posture, and shifts. Over 100 research reports (most since 1982) were revealed that specifically used the search terms. Unfortunately, few of these offered adequate descriptions of the coded behavior. A study's title or abstract might refer to "trunk shifts", but in the methodology, there was no indication whether these: a) involved only the "trunk" (i.e., torso) or also included (or were exclusively) arm or leg movement changes, or b) involved trunk lean, orientation, or rotation changes. As can be seen in the summary for body positions below, much work remains to be accomplished on specifically defining the body positions and how these can be coded.

Trunk lean. Trunk lean was the most popularly coded body position variable. Lean typically refers to the angle of the trunk with respect to a vertical line drawn from the midline of the head and chest, to the hips. Trunk lean is recorded as upright or erect (i.e., head and shoulders in a direct vertical line over the hips), forward lean (i.e., head and shoulders forward of upright relative to the hips), or backward lean (i.e., head and shoulders backward of upright relative to the hips) (Bente, 1989; Bernieri, & Gillis, 1995; Davis & Hadiks, 1994; Mehrabian, 1968).

Most often forward or backward lean were made with reference to another interactant; one study referenced lean with respect to the table between interactants. Sometimes this angle has been described further based on a range of five to 45 degree angle from upright (Cappella & Greene, 1984; Fairbanks, McGuire, & Harris, 1982). Several researchers also included sideways turn of the trunk to the left or right, and others referred to "trunk swivel","trunk rotation", or "trunk turn" where the shoulders are turned so that one shoulder is in front of the hips and one shoulder is behind the hips (Bente, 1989; Hall, 1984; Davis & Hadiks, 1994; Vrij, 1994). Trunk lean was nearly always described with reference to a seated position, but there also were investigations which included "upper body lean" when standing (Argyle & Dean, 1965; Mehrabian, 1968). Researchers sometimes recorded only the percent of time spent in a forward or in a backward lean. There also were the more ambiguous codings of "body lean change", "body lean away", "slouching", "slumping", "rocking", "crouching", "settling", and "rigid torso."

Trunk orientation. The trunk also can be described with reference to "orientation", i.e., degree to which an encoder's frontal body surface faces (i.e., vis-a`-vis) another encoder. Orientation most often was coded with respect to a range from zero to 90 degrees depending on whether the encoder was directly facing (i.e., zero degrees) or facing away from his/her interlocutor (i.e., turned away at a right angle, 90 degrees) (Capella & Green, 1984; Davis & Hadiks, 1994; Gifford, 1982; Honeycutt, 1989, Mehrabian, 1969; Street & Buller, 1988). Sometimes orientation was described only as "turned away" or "immediate", but was not further delineated. In some instances, coding of orientation was based on the alignment of the encoder's shoulders with the plane of

her/his seat edge, or the plane of the interactant's shoulders (Bernieri & Gillis, 1995). The lack of definition for body variables often proved frustrating. For example, Berry and Hansen (2000) reported positive relationships between personality variables such as "agreeableness" and "extraversion" and body position characterized as "open" which included ratings for both body orientation and body posture. While researchers may conjecture what "open" might refer to in regard to body position, our conjectures may not prove to be the same.

Arm, leg, and foot positions. With the exception of the numerous studies concerned with hand actions, attention to the arms, legs, and feet in body movement research has been focused on frequencies of arm and/or leg "movement" or "shifts" of any kind, or noting arm and leg positions with regard to the degree of "openness", "symmetry", or "relaxation"; these rarely were defined further. Sometimes researchers coded the presence of specific types of arm positions such as arms akimbo or "folded" arms. Mabry (1989), for example, defined five arm specific positions. Bente (1989) described arm movements with respect to horizontal, vertical, and forward or backward axes, while Kendon (1972) used the terms extension, retraction, or rotation to characterize arm movements. In our research (Harrigan & Carney, 2005), we code arm and leg positions with a code representing the actual configuration, e.g., arms folded, arms resting together in lap, legs crossed ankle on knee, lower legs and feet beneath the chair, etc.

Postural shifts. A majority of studies report total frequency of "postural shifts" or "postural movements", but precisely what these were was again unclear (Buller & Aune, 1987; Comadena, 1982; Frances, 1979; Vrij, 1994). Sometimes body positions were

described as “rigid” or “tense” but, exactly what was meant by these terms was open to speculation. “Postural shifts” were sometimes defined as any change in position or posture, but in at least one study, “leg movements” was the sole variable in this category. In one example of how postural shifts were used, investigators reported the effect of a psychotropic medication on patients’ nonverbal behaviors including “posture shifts”; unfortunately, these again were not defined (Ranelli & Miller, 1981). A few studies included specific, descriptive information with definitional details of the coded behavior for body position. An example is work by Hewes (1955) who studied and described, rather exhaustively, the world distribution of postures adopted for sitting and standing.

Body Actions

Social psychologists studying nonverbal behavior complemented the work of investigators conducting structural and descriptive studies by focusing their attention on underlying states revealed by nonverbal behavior, the so-called “external variable” approach. The best known work is that of Ekman and colleagues. Ekman and Friesen (1969a) outlined a coding system including five categories of nonverbal behavior: emblems, illustrators, regulators, adaptors, and affect displays. (The latter refers primarily to the face and is more thoroughly discussed in Chapter 2 of this volume.) Ekman and Friesen’s categories for movements have been the most frequently used by researchers compared with any other coding strategy (e.g., Labanotation, Birdwhistell’s kinesics, etc.). Indeed Ekman and Friesen’s categories are used so widely that in their methodological descriptions researchers do not even define the variables but simply reference Ekman and Friesen (1969a). Their work also provides a theoretical framework for understanding hand movements in particular. For these reasons Ekman and Friesen’s

categories will be detailed extensively here. This review will show the current stage of the research on hand movements, i.e., slowly evolving, but yet rudimentary and uncoordinated methodologically and theoretically. The review will be followed by suggestions for investigators interested in coding hand movements. As mentioned earlier the great focus in body actions has been on the hands, and Ekman and Friesen's (1969a) coding system is not an exception.

Emblems. The term emblem, comes from the work of Efron (1941) who provided an impressive, descriptive study of gestures used by second generation Jews and Italians in New York City. Ekman and Friesen refined their definition of emblem to refer to symbolic actions which have a "specific verbal translation known to most members of a subculture, and is typically intended to send a message (Ekman & Friesen, 1977, p. 38)." Some examples include: head nod, shoulder shrug, and "OK" sign. Because these acts are so communicative, emblems are more intentional and less idiosyncratic than other types of movements, and depending on the individual's emotional state, can result in "emblematic slips" much like slips of the tongue (Ekman, 1977).

Using an encoding-decoding procedure (i.e., back-translation) in which native speakers' displays of various emblems were judged by members of the same speech community as the native speakers, a list of emblems was compiled (Johnson, Ekman, & Friesen, 1975). Decoding reliability in this study was quite high, and indicated specific emblems that can be used for: making requests, conveying insults, indicating personal needs, providing replies, and giving greetings or goodbyes within at least an American subculture (i.e., San Francisco Bay area). There are a number of studies on cultural differences in emblems (see Box 4.1).

(Insert Box 4.1 about here)

Illustrators. A second category of nonverbal behavior described by Ekman and Friesen, illustrators, are "movements directly tied to speech, serving to illustrate what is being said verbally (1969a, p. 68)." These movements can accent or emphasize a word or phrase (baton), draw the shape of the referent (pictograph), sketch a path or direction of thought (ideograph), depict a bodily action (kinetograph), or be movements that point to an object (deictic), or depict a spatial (spatial) relationship (1969a, p. 68). While emblems are typically exhibited purposefully and tend to be culture-specific (although the latter is less so as culture-to-culture contact increases via media sources), the display of illustrators usually involves less direct awareness and intention, and these acts generally do not have meaning separate from the verbal speech stream; typically, listeners do not gesture, for example. Like emblems, illustrators are culturally learned, and have an effect on observers' impressions of the encoder (Ekman & Friesen, 1969a, p. 69). Illustrators also have been labeled as: object-focused movements (Freedman & Hoffman, 1967), hand illustrators (Cohen & Harrison, 1973), gesticulations (Kendon, 1980), illustrative gestures (Street & Buller, 1987), representational gestures (McNeill, 1992), and conversational gestures (Krauss, Chen, & Chawla, 1996). Several studies have been conducted on the functions of illustrators (see Box 4.2)

(Insert Box 4.2 about here)

Adaptors. The third category in Ekman and Friesen's (1969a) classification system was originally labeled adaptors, and of the three types (i.e., self, object, alter) self-adaptors have received the most attention in Ekman's and other researchers' investigations. This label was changed to "self-manipulator" (Ekman & Friesen, 1977)

and then “body manipulator” (Ekman, 1977) because “self-adaptors” was considered “too theoretically laden (Ekman, 1977, p. 46).” (See Ekman and Friesen, 1969a, b, 1972, 1974 for more theoretical detail on “adaptors.”) Although Ekman’s newer terminology for these actions was intended to be more descriptive, the term “self-adaptor” is most often used by those who study these hand movements and will be the term used here (Grahe & Bernieri, 1999; Heilveil & Muehleman, 1981; Hill, 1990; Street & Buller, 1988; Vrij, 1995). These actions have been given a variety of names: “embarrassed hands” (Ferenczi, 1914), “autistic” movements (Krout, 1935), “self-manipulators” (Rosenfeld, 1966), “body-focused” movements (Freedman, 1972, 1977; Freedman & Hoffman, 1967), “self-touching gestures” (Kimura, 1976), “manipulative gestures” (Edelman & Hampson, 1979), “contact acts” (Bull & Connelly, 1985), and “self-touching” (Harrigan, 1985; Harrigan, Kues, Steffen, & Rosenthal, 1987; Shreve, Harrigan, Kues, & Kangas, 1988).

Self-adaptors involve one part of the body doing something to another body part such as scratching one’s head, stoking the chin, hand-to-hand movements, lip-licking, and hair grooming (Ekman, 1977, p.47). These movements often are considered grooming or personal actions best not displayed in polite society (Ekman, 1977). Another type of adaptor occurs in similar circumstances, object manipulators, and involves such actions as playing with a pencil, twisting a book of matches, scratching the ear with a paper clip, and other actions involving handling an object or using an object for some type of body contact (p. 47). Either type of adaptor is usually displayed “with little awareness, without the deliberate intent to communicate a message (Ekman & Friesen, 1977, p. 39).” Such actions, however, seem to convey some diffuse information to observers regarding the encoder’s emotional state, pathology, deceptiveness, and general

personality traits (Ekman, 1977; Ekman & Friesen, 1974, 1977; Ekman, Friesen, & Scherer, 1976).

The research findings of Freedman, and Harrigan and their colleagues on body-focused movements or self-adaptors (see Box 4.3) suggest two critical distinctions regarding the display and interpretation of these hand actions. First, in most studies no distinction has been made with respect to the area where the action occurs, and second, the temporal length of the self-touching usually is not considered. There are exceptions however. Friesen, Ekman, and Wallbott (1979) focused on the classification of hand movements and coding reliabilities. They included "brief" (i.e., less than 2 seconds) and "long" (i.e., more than 2 seconds) manipulations (i.e., self-adaptors), and distinguished among face, hand, and other manipulations. One rationale for their temporal distinction was that a brief manipulator "seems to accomplish something (p.107)" whereas long manipulations appeared more like the fidgeting, unpattterned movements described by Freedman and colleagues. In addition, Friesen et al (1979) noted that the region or area of the body that was manipulated was important as was the type of self-adaptor (i.e., scratching, rubbing, picking). Buller and Aune (1987) also coded self-adaptors with respect to body area and temporal parameters, and Mintzlaff, Carney, and Harrigan (1999) found differences for type of self-adaptors and "defensiveness." Several studies have been focused on the functions and descriptive characteristics of adaptors (self-touching) (see Box 4.3)

(Insert Box 4.3 about here)

The point of this discussion is to direct researchers' attention to the possibility that it may be more productive or illuminating to distinguish among self-adaptors based

on temporal length, body area, and type of action. In general, researchers have included only one inclusive category for coding self-adaptors, and the results of the few studies cited above suggest that significant information may be lost when all self-adaptors are lumped together as though they represent the same act.

[The area of touch, in which one person touches another, will not be covered in this chapter because, in general, touching others does not often occur in most social interactions. Exceptions include settings involving greetings and farewells, intimate encounters, providing comfort or service to another, aggressive confrontations, and the like. This omission of touch is not intended to indicate that touch is not worthy of study. On the contrary, it is an important and powerful action, which is compelling and capable of affecting another in positive or negative ways. Display rules and conventions regarding touch are themselves a subject of sensitivity, sometimes causing confusion and misinterpretation. Thorough reviews can be found in Heller & Schiff (1991) and Jones (1994). Examples of touch studies include those concerned with: gender (Hall & Veccia, 1990), cultural differences (Albert & Ha, 2004; Nail, Harton, & Decker, 2003); and medical or psychotherapic contact (McNeil & Fawn, 2004; Stenzel & Rupert, 2004; Wendler, 2003). Perhaps some of the most profound results on the effects of touch are those by Tiffany Field showing dramatic gains from the use of touch on premature infants with respect to weight gain and developmental advances (Field, 2001).]

Regulators. Regulators represent another category of nonverbal behavior distinguished by Ekman and Friesen (1969a). These are “actions which maintain and regulate the back-and-forth” flow of conversation between speakers and listeners (p. 82), and include head nods, eye contact, postural shifts, eyebrow movements, and utterances

such as "*mm-hmm*." Regulators contain no meaning by themselves but "convey information necessary for the pacing of the conversation (p. 82)." These actions usually occur on the "periphery of awareness" on the part of the encoder, they are not as intentional as emblems, illustrators, or adaptors, and are maintained in one's repertoire as "highly over-learned habits (p. 83)." Other researchers have studied these conversational exchange behaviors (Duncan, 1972, 1983; Erickson, 1975; Edelsky, 1981; Harrigan, 1985; Scheflen, 1964). Duncan and Fiske (1977) detailed, with thoroughness, the use of body movements (head, hand, eye contact, postural shifts, vocal changes) in an elaborate rule system for the smooth exchange of speaking and listening roles in dyads. Similarly, other investigators have described turn-taking rules in group interactions (Dabbs & Ruback, 1984; Harrigan, 1985). The "functional" purpose of "interactive" gestures has been proposed by Bavelas (1994) who included "delivery", "citing", "seeking," and "turn" gestures. (See Feldstein and Welkowitz, 1987 and Rosenfeld, 1987 for a more complete discussion of definitional issues in "turn-taking" research.) Hand movements coded in our research program (Harrigan & Carney, 2005) involving social interactions in a conversational distance include: speech illustrative gestures, emblems (when these rare behaviors occur), self-touching delineated by duration and location, and object manipulations (e.g., fingering a pencil).

Head Movements

The last category of body movements to consider is head movements. Not surprisingly, the most typical action counted when coding head movement is nodding, but other movements also are notable: shaking, tilting (i.e., head drawn toward shoulder;

sometimes termed head cocks), and movements associated with gaze such as turning the head or the slight movements which occur when speaking or listening (Condon & Ogston, 1966, 1967; Kendon, 1970). Still, other references to head movement include: “dipping” (i.e., downward movement), “bobbing” and “tossing” (i.e., drawing head up sharply), “thrusting” (i.e., abrupt upward lift toward interactant), “dropping” (i.e., abrupt downward movement), and “postural shifts” (i.e., head turns). Frequently, “head movements” were coded, referring to “any” movement of the head.

There are more than seventy articles in which head movements were coded in humans, and of these nearly 80% were on nodding. “Nodding” is not a distinctly human activity; it is displayed by mice, dogs, rats, horses, birds, and insects in courtship displays, pathological states, and in human-animal contact. In addition to its expressive function, head nodding in humans is one of several stereotypical movements often exhibited in pathological brain states (e.g., dementia, tissue damage, psychosis, mental retardation, aphasia, nystagmus [persistent, rapid side-to-side eye movement]).

Research articles on coding of human expressive head movements were discovered searching PsycInfo with the terms “head nod”, “head shake”, “head tilt”, “head cock”, “head dip”, and “head movements.” Additional references were collected from the computerized literature search described earlier for “nonverbal behavior” which included nods and other actions of the head. Close perusal was made of 55 research articles/chapters on nodding, 14 on shaking, eight on tilting, and 25 involving “any” head movement.

Researchers defined head nodding with descriptions which incorporated the type as well as, direction of movement: cyclical or continuous, up/downward or

forward/backward motions on the vertical or sagittal plane. Sometimes these movements were only called “affirmative” or “positive” nods. Likewise, descriptions of head shaking included cyclical or continuous, side-to-side, left/right motions on the horizontal or traverse plane; these actions were also referred to as “negative” nods, “normal movements in speech”, “shaking to emphasize speech”, and “horizontal nodding.” Head tilts were described as a sideways or lateral tilt of the head toward the shoulder. McGrew (1972) was by far the best at providing a technical definition of nodding ...”[T]he head is moved forward and backward on the condyles resting on the atlas vertebra, resulting in the face moving down and up (p. 57).” Generally, in most research reports little description was given for the coded head actions.

There are very few studies of head shaking as a coded head behavior. Hill and Stephany (1990) found that clients reported feeling supported when listening therapists exhibited head shaking, in addition to head nodding (Hill & Stephany, 1990). Shaking by the therapist was thought to convey sympathy with the client’s plight. Comparison studies using head nodding and head shaking showed that participants who were induced to head nod (versus head shake) were more likely to agree with an editorial that they read (Wells & Petty, 1980). Similarly, researchers demonstrated that head shaking (versus nodding) produced more prosocial feelings toward a videotaped individual who described a personal, negative situation (Tamir, Robinson, Clore, Martin, & Walker, 2004. Human faces are learned faster when accompanied by head nodding or shaking compared with no movement (Lander & Bruce, 2003), and both actions appear to operate as a mnemonic for positive and negative (respectively) thoughts and feelings (Förster & Strack, 1996; Tom, Petersen, Lau, Burton, & Cook, 1992). Reminiscent of earlier work by Dittman and

Llewellyn (1967, 1968), studies have shown that rhythmic head movements produced during speech improved speech perception (Munhall, Jones, Callan, Kuratate, & Vatikiotis-Bateson, 2004). Such head movements are thought to be linked to the production of suprasegmental features of speech like stress, amplitude, and pitch (Hadar, Steiner, Grant, & Rose, 1983, 1984).

While there are a couple of studies involving head tilting (Noller & Callan, 1989; Noller & Gallois, 1985; Troisi & Moles, 1999), significant results were minimal: head tilts occurred more often in families with adolescent daughters, and were displayed more by adolescents and wives (versus husbands) (Noller & Callan, 1989; Noller & Gallois, 1985). As indicated earlier, there are a great many studies on head nodding (see Box 4.4).

(Insert Box 4.4 about here)

In summary, although head movements commonly occur in social interactions, only head nodding has received much attention. Like other areas of body movement, head actions have not been diligently defined. In our research (Harrigan & Carney, 2005), head actions include nodding, shaking, and tilting, with a miscellaneous category for any movement that is not one of the former head actions; the latter are subtle and often occur when speaking, or as listener responses. Head movements associated with directing and changing gaze are coded with reference to the specific gaze variable (e.g., gaze at interactant). Our definitional reference points for the three head actions are based on imaginary lines drawn: 1) horizontally across the tip of the nose (nod), and 2) vertically from the top of the face to the chin bisecting the nose (shake); resulting in two axes and four quadrants. When the nose crosses either of the imaginary lines and enters both the lower and upper half (or section) of the vertical dimension (nod), or enters both the left

and right halves of the horizontal section (shake), it is coded accordingly. Head tilts involve movements of the head being drawn toward either shoulder. Two other movements can be coded. A head dip involves drawing the chin toward the chest without an upward lift (as in a nod), and a head toss is an upward lift of the chin without a subsequent movement downward (like a nod); a head toss is often an abrupt action. The latter two actions occur very rarely. All of these actions vary in intensity, breadth, and frequency and range from fast, vigorous, long head nods to slow, subtle, narrow head shakes.

Technology for coding head movements is minimal to nonexistent. Hadar, Steiner, and Rose (1985) used a polarized light goniometer (i.e., instrument for measuring relationships of moving body parts to one another, e.g., legs and trunk while walking) to systematically record the up/down and left/right cycles in nodding and shaking (respectively) to demonstrate their relationship to various conversational behaviors (i.e., listener responses, speaker-turn attempts, speech stress). Bente (1989) developed a computer program (see below) that is capable of generating scripts for graphic computer animations of head (and body) movement.

Other Approaches to Studying Body Movement

Behavioral rating studies. A less time consuming method of determining the individual effects of specific body movements (e.g., hand gestures, nods, posture shifts) are behavioral rating studies. In these studies body movements are not coded individually but rather, are rated; thus data collection (i.e., ratings) is considerably more economical. Burgoon and others (Burgoon & Koper, 1984; Burgoon Birk, & Pfau, 1990; Guerrero, 1997) asked observers to rate participants' behavior using bipolar adjectives reflecting: 1)

global assessments of overall behavior (i.e., calm, composed, reticent, attentive), and 2) specific combinations of participants' body movements such as "random movement" (i.e., self-touching, rocking, twisting), and "kinesic pleasantness" (i.e., nodding, smiling). For example, these indices of body movement and global measures of arousal were shown to be highly correlated in the psychotherapy context (Burgoon, LePoire, Beutler, Bergan, & Engle, 1992). A recent meta-analysis showed the important influence of communication channel (i.e., visual, vocal, both) on ratings of participants' state anxiety and trait anxiety (Harrigan, Wilson, & Rosenthal, 2003). Hall and Friedman (1999) combined both global ratings and measurement of discrete behaviors in a study on status, gender, and nonverbal behavior.

Instrumentation for Coding Body Movement

Scherer and Wallbott (1985) present an approach to studying nonverbal behavior that focused on distinguishing among variables derived from the Brunswikian lens model (Brunswik, 1956) where: 1) motor cues might include EMG recordings of facial behavior or elaborate devices to position the head and measure gaze behavior with remarkable accuracy, 2) distal cues could include the study of acoustic waveforms (e.g., to capture amplitude, fundamental frequency, & intonation patterns) or light-emitting devices (i.e., LEDs) to acquire precise measurements of body movements, and 3) proximal cues involving codings of or impressions of behaviors by observers such as hand gestures, head nods, and shoulder shrugs. In line with this model was a coding technique developed by Frey and Pool (1976) where a cross-hair device was inserted into a videotape recording and used by coders to locate various head and body movements with reference to the vertical and horizontal lines. There are a few studies by one research

group (Bente, Donaghy, & Suwelack, 1998; Bente, Kramer, Peterson, & deRuiter, 2001) in which the positions and movements of the head, trunk, and limbs were categorized using a computerized version of the Bernese system (described earlier). Their work also permitted a computer simulation of positions and movements transformed from actual dyadic interactions which then could be modified or reconfigured to assess impressions of various life-like body movements and positions (Bente, Feist, & Elder, 1996). Transducers (i.e., small ultrasonic devices) can also be attached to various body parts and a microcomputer can then determine receiver-transducer distances and plot three-dimensional positions of movement (Altofer, et al., 2000).

Finally, Blascovich and colleagues, and others (Biocca & Levy, 1995, Guye-Vuilleme, Capin, Pandzic, Thalmann, & Thalmann, 1999), have developed methods of studying nonverbal behavior using computer generated "immersive virtual environments (IVEs; Blascovich, Loomis, Beall, Swinth, Hoyt, & Bailenson, 2002). For example, Bailenson, Blascovich, Beall, & Loomis (2003) showed that participants approached by a virtual human in a virtual room behaved in a manner that was similar to human-to-human approach (Hayduk, 1983). These efforts offer considerable advantages to researchers interested in nonverbal behavior.

Training Coders and Determining Reliability for Coded Body Movement

The most common method of recording body movements is the use of human observers. Typically, the researcher begins with clear definitions and parameters of each of the behaviors to be coded, and trains coders, often students, in recording the specific behaviors. Coders learn the various behaviors and their descriptions, view samples of the participants' behavior, and record the designated behaviors as frequency or duration

tallies, or based on the specific time of occurrence, or in relation to some other feature of the interaction (e.g., speaking turn, greeting, response to interviewer, etc.). Most often behavior is coded from videotaped interactions which permit the viewing and reviewing that is necessary to establish a high level of accuracy and confidence in the coded behaviors.

After the initial training and practice, the coders' data is checked for reliability, and if necessary, additional clarification of the variables and re-training is instituted to increase accuracy in future coding. Respectable reliabilities can be obtained for most body movements. When acceptable reliabilities are established, each coder is then dispatched independently to complete the coding of the behaviors in question. Sometimes the preliminary reliability analysis reveals inadequacies in the coding, and clarification and re-training are necessary. Continued reliability checks throughout the coding procedure are encouraged to help maintain a high level of accuracy in coding.

It goes without saying that whenever behaviors are coded and counted, the accuracy of the behavioral coding is paramount. The limited range of methods for defining and measuring coded body movements parallels a similar difficulty with regard to assessing reliability for coded body movement. Acceptable reliability thresholds are most often set at .80 or better (Baesler & Burgoon, 1987; Becker-Stoll, Delius, & Scheitenberger, 2001; Friesen, Ekman, & Wallbott, 1979). Although there are some studies in which two coders recorded all of the behaviors (Goldberg & Rosenthal, 1986; Harrigan, Oxman, & Rosenthal, 1985; Mintzlaff, et al., 1999; Shreve et al., 1988; Mehrabian & Friar, 1969), typically 10 to 25% of the total data collected has been coded

by at least two coders (Duncan & Fiske, 1977; Jurich & Jurich, 1974; O'Leary & Gallois, 1985).

There are several methods that have been used to ascertain interrater reliability: percent agreement, Cohen's *kappa*, Spearman's *rho,* Pearson's *r*, Ebel's or Winer's interrater analysis using intraclass correlation, and Rosenthal's (1987) application of the Spearman-Brown formula. It is not within the scope of this chapter to cover the important aspects of reliability with respect to coding body movement as this is thoroughly discussed in Chapter 5 of this volume, Conducting Judgment Studies (see Rosenthal, this volume). With regard to specific reliabilities for body movement, Baesler and Burgoon (1987) conducted the most thorough evaluation of reliability measures for nonverbal behavior. From their data of 40-plus studies, Baesler and Burgoon (1987) found very high (i.e., .81 or better) median reliabilities for all categories of body movement, e.g., hand gestures, arm and leg positions, trunk movements, self-touching, nodding, and postural shifts.

Suggestions for Coding Body Positions and Actions.

Several elements of the research study affect the choice of body movements one might include: the number of interactants, setting and relationship between interactants, and how the research question is reflected in body movement. Investigations in which body positions and actions are either measured or manipulated primarily involve dyadic interactions, although there are some studies involving members of a group (Altorfer, Goldstein, Miklowitz, & Nuechterlein, 1992; Harrigan, 1980, 1985; Mabry, 1989; Noller & Callan, 1989). While one might display a head nod, shrug, gesture, or the like when alone, these actions are very rare and often are associated with vigorous mental debate as

one thinks through an issue or puzzles out a problem. Many body actions are expressive and thus, more likely in interactive versus solitary settings. The paucity of studies of body movement in groups is likely related to the difficulty of coding behavior for more than two individuals such as a participant and confederate, interviewer and interviewee, mother and child, etc. Research settings for studies on body movement include: therapy interactions, employment interviews, conversations between friends or strangers, or encounters in a lab, educational, or public environment.

The research question is an important determinant of what body movements are chosen to be manipulated or coded. As indicated earlier, body movements do not provide direct information about affect, but can convey significant information about the strength of an affect: e.g., an angry face with a clenched fist and tense upper body, or a sad voice with drooping posture and curtailed hand and head actions. Whether intentional or not, many body actions are expressive, and conducive to revealing personal attributes (e.g., warm, impulsive, argumentative, stable) and motivations such as attentiveness, interest, vitality, sociability, competitiveness, etc. Body positions may convey one's attitude, status, and degree of affiliation based on how one positions her/himself in relation to another: e.g., sitting close, facing, and leaning slightly forward toward an interactant versus sitting turned and angled away with crossed legs between interactant and self. In some studies one category of body movements may be more important than another: e.g., investigations of turn-taking will be focused on hand and head actions relevant to speaking and listening (i.e., speech-related gestures, head nods), while those directed toward cultural similarity and diversity in hand actions will concentrate on emblems of the hands and head.

A guide for decisions regarding which of the many body positions and actions to include in a study may be suggested: 1) when the research questions are focused on the more enduring qualities of the interaction (e.g., status, attitude, affiliation), body positions may provide initial impressions, and 2) for questions regarding characteristics which can change quickly and moment-to-moment (e.g., warmth, animation, vigorous), expressive hand and head actions may be most evocative. Body positions are often tallied individually, but may contribute more information when treated together (e.g., change in trunk lean and orientation with repositioning the arms and legs). Both body positions and actions contribute different information about the encounter and often work together. For example, several coded behaviors were included in studies of those who were physicians, deceivers, embarrassed, courting couples: distance, trunk lean and orientation, arm and leg positions, head and hand actions, and smiling and gaze (Costa, Dinsbach, Manstead, & Ricci Bitti, 2001; Grammer, et al., 2000; Harrigan, Oxman, & Rosenthal, 1985).

Gaze

A literature review on "gaze" (included eye contact, looking, glancing, visual attention) since the 1982 Handbook recovered over 1700 articles, but only a small portion (13%) was relevant to affect and nonverbal behavior. Few of these had clear descriptions of the methodology used in coding gaze. Exline and Fehr's (1982) stellar review of research methodologies in coding gaze in the Handbook, and Fehr and Exline's (1987) chapter review on research results in gaze research have not been eclipsed. The present brief review will focus on points made by these authors, with respect to research methodology for gaze, as well as those of other researchers.

Functions of Gaze

One of the first to study gaze directly was Kendon (1967) who distinguished several functions of gaze: 1) monitoring – "to gather information about how [an interactant] is behaving (p. 53)" i.e., to seek feedback or a "response" from a listener, 2) regulatory – to signal one's intentions with respect to "floor apportionment" (switching speaking turns; see below), and 3) expressive – to reveal feelings and attitudes (e.g., gaze avoidance at points of "high emotion"). With respect to the latter function, the eyes play an important role in Ekman and Friesen's (1975) descriptions of the universal emotions (widened eyes in fear; tensed lower lids in anger; see Chapter 2). Recent research results (Adams & Kleck, 2003) showed that direct versus averted gaze significantly facilitated the processing of facial expressions of affect. Direct or averted gaze also influenced participants' speed in gender categorization of targets and rate of accessing semantic memory (Macrae, Hood, Milne, Rowe, and Mason, 2002).

Von Cranach (1971) considered gaze as part of a general "orienting behavior." Gaze is unique among nonverbal behaviors in that it is a sensory/perceptual organ for gathering information and also acts as a signal to others. For example, Cary (1978) suggested that following a glance of recognition at a stranger, gaze avoidance is typical, and that heightened gaze indicates a desire for communication. Goffman (1963) discussed the rule-governed nature of gaze, citing examples such as "civil inattention" (i.e., not gazing at strangers in public settings) or "cutting" (i.e., visually ignoring another). Because our gaze patterns provide information regarding our attention, interest, and possible motivations and intentions, gaze has been the subject of much research. More recently, gaze has been less frequently studied as an individual class of variables

(e.g., mutual gaze, staring, glances), but rather studied with other nonverbal behaviors subsumed under larger constructs such as affiliation, intimacy, conversation, attention, and dominance.

Research Considerations for Gaze

Location. One of the first questions a researcher must decide is WHERE the data will be collected: in a naturalistic environment or in the laboratory. The obvious distinction between these is in: the degree of control over the participants' behavior, and technical issues involving measurement precision, obtrusiveness, reliability, and validity. While public locations can be found where people can be observed inconspicuously, the distance at which this must be accomplished may compromise the collection of reliable and valid data, and may limit the number of gaze variables that can be accurately recorded. For example, in La France and Mayo's (1976) study, observers were able to record, via stopwatches and tally sheets, the amount of time one spent listening and looking at the face of another in an interacting dyad. Settings were public (e.g., cafeterias, hospital waiting rooms, fast-food outlets). Problems in such circumstances arise from distance from the observed, as well as positioning of observers, acuity, and reliability of measures. Many of these problems can be resolved by videotaping the interactions, but this results in other perplexing issues: narrowed scope of observation (i.e., due to video camera position), illumination, and obtrusiveness. Kendon and Ferber (1973) were able to position a camera inconspicuously at a distance from the observed, but detecting a person's visual target was impossible to specify unequivocally. While a zoom lens (Cary, 1978) helps remedy this difficulty and provides higher resolution, problems remain with

illumination, movement out of the camera range, and expense. In a laboratory many of these challenging issues can be resolved.

The difficulties inherent in measuring gaze in the field, have led many researchers to choose manipulation rather than measurement of gaze in such settings. The effects of confederate's gaze on the observed were studied with respect to staring (Ellsworth, Carlsmith, & Henson, 1972), aiding a victim (Ellsworth & Langer, 1976) giving money (Kleinke, 1977), and compliance (Snyder, Grether, & Keller, 1974). In these studies, however, it was often difficult to impossible to judge whether or not participants had been aware of confederates' gaze. Assessing participants' awareness of another's gaze in the field (e.g., in a cafeteria, car, airport) is nearly infeasible compared with the lab where technical equipment, one-way mirrors, and confederates' faces are readily apparent, and where questionnaires assessing confederate gaze can be easily administered to participants.

Number of Participants. A second consideration in gaze research is the number of participants observed at any one time. While field studies can be used to record participants' gaze at others or at objects, the laboratory is essential for precise coding of visual behavior in social interaction. Deciding on the observational setting is necessarily based on the researcher's unit of analysis. Is the research question based on the effect of social stimuli (e.g., interviewer warmth) on a participant, or the relationship between two interactants (e.g., conversational roles)? In the former case, participants' gaze behavior can be measured while a confederate's gaze pattern is controlled (Aiello, 1972; Exline, Gray, & Schuette, 1965); training and frequent checks of confederate's nonverbal behavior is essential. If the confederate's gaze also is allowed to vary, measurement of

the confederate's gaze also is required for valid data. When data on both participants' gaze patterns are needed to answer research questions, technical challenges arise which necessitate equipment to record both parties and to integrate accurately the gaze behavior (e.g., split-screen).

Use of Confederates. The latter issue relates to another consideration in gaze research, whether or not to use a confederate, which, while permitting control over some features of visual interaction, also results in a loss of spontaneity. Confederates can be trained to look at the participant at specific times during the interaction (Fehr, 1981; LeCompte & Rosenfeld, 1971), or according to specified visual patterns (e.g., continuously, only while talking) (Argyle, Lefebre, & Cook, 1974). Remarkable precision in controlling confederate gaze was obtained by administering slight cueing shocks to the confederate's hand without the participants' awareness (Ellyson, Dovidio, Corson, & Vinicur, 1980). Even if they are unaware of the research hypothesis, introducing a confederate also exposes the possibility that other confederate behaviors systematically bias (Rosenthal, 1966) the results (e.g., behaving more "warmly" to participants in no or low gaze conditions). Exline and Fehr (1982) reported that confederates experienced "affective reactions" to altering their normal gaze patterns, and this affected other nonverbal behaviors (e.g., head nods, gestures, posture). An additional factor to consider is that, confederates may not behave similarly to all participants. Assessing the effect of confederate's gaze on participant behaviors or attitudes, requires attention to the possibility that such behaviors and impressions may be affected by the gaze patterns under investigation, or by the confederate's discomfort with violating gaze norms, the attendant arousal associated with gaze at another (Ellsworth, 1975), or

receiving gaze from another (Exline, 1972; Exline & Fehr, 1982). Training can help reduce these affective reactions and standardize confederate behavior (Ellsworth & Ross, 1975), but investigation of potential effects is warranted.

Selection of gaze variables. Like many other research considerations, choosing the gaze variables depends upon the research question. "Gaze" refers to where an individual looks and "eye contact" (i.e., mutual gaze) references direct eye to eye looking between individuals. Most often in a dyad, gaze variables include: 1) frequency – number of glances at partner, 2) total duration or total gaze – total number of seconds looking at partner, 3) proportion of time looking during a specified activity (e.g., listening, speaking), 4) average duration – mean duration of individual glances, 5) standard deviation of glances, and 6) mutual gaze – number of seconds partners look into each other's eyes simultaneously (Argyle & Ingham, 1972; Exline & Fehr, 1982); the latter has been the most investigated. Many of these variables are intercorrelated (Duncan & Fiske, 1977; Exline & Fehr, 1982; Kendon & Cook, 1969). Von Cranach (1971) has suggested "face gaze" to denote glances toward another's face when eye contact cannot be determined precisely, and "eye gaze" for reference to looking into another's eyes (Harper, Wiens, & Matarazzo, 1978). Kirkland and Lewis (1976) distinguished other forms of eye movement: glance, look, gaze, leer, and stare on the basis of duration.

Prevailing Topics in Gaze Research

There are two areas in gaze research which have received considerable attention in studies of visual interaction with adults: the role of gaze in conversation as a mechanism for speaker switching, and the role of gaze in balancing the level of intimacy

between interactants. Research on the function of gaze in the expression of affect has been rather limited. While the eyebrows and musculature surrounding the eyes play a prominent role in the Facial Affect Coding System developed by Ekman and Friesen (1978), a person's visual focus is relevant only for the expression of sadness (i.e., gaze down). Participants induced to feel depressed exhibited less gaze toward a confederate (Natale, 1977), as did those reporting embarrassment (Edelmann & Hampson, 1979), anxiety (Jurich & Jurich, 1974), and actresses expressing despair, rage, annoyance, or anxiety (Lalljee cited in Argyle & Cook, 1976, pp.79-80; see also Lalljee, 1978). The relationship between gaze patterns and emotional experiences clearly requires considerable clarification. It may be gaze is germane for only a few emotions or that it may be relevant in showing emotional intensity. These and similar questions concerning gaze and emotion remain unanswered.

Gaze in conversational roles. One of the most often studied topics in gaze research is the relationship between gaze and speaking-listening roles in conversation. In dyads, listeners spend considerably more time gazing at their speakers than they do when speaking (Ellyson et al., 1980; Exline et al., 1965; Kendon, 1967). Researchers have attributed this difference to the fact that speakers need to decrease external distraction in order to attend to the planning and delivery of speech, and to decrease sensory overload. Listeners presumably are providing feedback to speakers concerning their interest. Mutual gaze, although physiologically arousing (Argyle & Dean, 1965; McBride, King, & James, 1965), occurs frequently in social interaction, and is reported to be related to topic intimacy and distance (Argyle & Cook, 1976; Fehr & Exline, 1987). Strongman and Champness (1968) proposed a probabilistic formula, "chance model", to predict the

amount of mutual gaze from levels of individual gaze, and while independent researchers substantiated expected levels of mutual gaze in independent studies (Lazzerini, Stephenson, & Neave, 1978; Rutter, Stephenson, Lazzerini, Ayling, & White, 1977), Exline and Fehr (1982) point out that "[a}nother human is a socially significant event that captures far more of our attention…than a truly chance model would predict (p.115)." Very little research on gaze exists in conversations of more than two individuals, however, more speaker-to-listener gaze was reported in group interactions (i.e., three or more) (Exline, 1963; Harrigan & Steffen, 1983; Weisbrod, 1956 as reported in Argyle & Cook, 1976).

Gaze also plays an important role in speaker-turn exchange in conversations. Kendon (1967) described a distinctive pattern of gazing at speaker-listener transition points in which speakers gaze away when initiating an utterance and look toward their listener at the conclusion of a turn. This signaling effect of gaze has been confirmed for at least the terminal phase of turn-taking (Beattie, 1978; Duncan & Fiske, 1977; Rutter, Stephenson, Ayling, & White, 1978; Wiemann & Knapp, 1975). Contradictory results may be related to durations of the "switching phase", presence of hesitant speech, definitions of an utterance, and duration of gaze sampling (Fehr & Exline, 1987; see also Goodwin, 1981). Gaze patterns for speaker turn switching may differ in dyads compared with group conversational cues. For example, Harrigan and Steffen (1983) found that speakers in a group conversation tended to gaze toward a listener when beginning a speaking turn; this was especially true for successful interruptions.

Intimacy Equilibrium Model. The Intimacy Equilibrium Model (Argyle & Dean, 1965; revised Argyle & Cook, 1976) which suggests that there are approach-avoidance

forces at work in eye contact with another person and that these forces are held in check by components of intimacy which can be changed to maintain equilibrium for either party. Thus, if one experiences too much intimacy with another, changes can be made in the degree of eye contact, physical distance, topic intimacy, smiling, etc.). This model has received considerable attention. Stephenson, Rutter, and Dore (1973) conducted several studies of the effect of increased gaze associated with increased distance and determined that their results supported the equilibrium hypothesis. Cappella (1981) and others (Ellsworth, 1978), however, reported some compensatory actions when intimacy increased, but also noted reciprocal actions. Finally, Patterson (1982) included social control together with intimacy as forces which result in compensatory and reciprocal actions.

Measurement Issues in Gaze Research

Reliability. Finally, issues involving reliability and validity need be considered. Coders have been shown to be quite reliable in discerning another's gaze under optimal conditions, with reliabilities ranging between .88 and .99 (Exline & Fehr, 1982). Argyle and Cook (1976) provide detailed data on reliability of gaze observations. High reliability estimates are more likely to be obtained when coding is based on videotaped or filmed rather than live sequences because of the advantages of re-play and slow motion viewing. New technologies have been advanced to more accurately track eye movements; these are often used in studies of visual attention. Eizenman developed the instrumentation and software analyses, and together with colleagues (Eizenman, Yu, Grupp, Eizenman, Ellenbogen, Gemar, & Levitan, 2003) has demonstrated remarkable specificity in fixations and glance durations using the high resolution eye tracker. This instrument

could be placed behind a participant (A) who receives the gaze of another participant (B) to more definitively code gaze from B to A.

Estimating another's gaze. Studies of participants' assessments of another's gaze have met with mixed results. Argyle and Williams (1969) determined that participants were generally unaware, while Ellsworth and Ross (1975) noted that the degree of gazing (i.e., high or low) had a direct bearing on participants' sensitivity. The meaning attributed to another's gaze can be assessed by ratings or questionnaires of the interacting confederates (Argyle et al., 1974) or videotaped others (Kleck & Nuessle, 1968; Kleinke, Meeker, & La Fong, 1974).

Validity. Validity in coding visual interaction is more problematic to ascertain. "[H]umans are not as accurate as desired in determining when others look them *directly* (italics added) in the eye(s) (Exline & Fehr, 1982, p. 122)." Validity levels for "eye-directed" gaze are considerably worse than for "face-directed" gaze. Participants' attempts to discriminate gazes into their eyes versus other parts of their face resulted in very low accuracy (i.e., 10-35% accurate depending on distance; Krüger & Hückstedt, 1969; cited in Exline & Fehr, 1982; see also Ellgring, 1970). However, there seems to be a wide margin to the left and right of one's face ("off-the-face-gazes") that is interpreted as gaze from another (Gibson & Pick, 1963). Judgment errors increase as the head deviates from a straight-on position, as distance between interactants increases, or as gaze duration decreases (Argyle & Cook, 1976; Exline & Fehr, 1982).

Obtaining maximally valid data requires the use of restrictive and cumbersome techniques (i.e., chin rests, head sets) to control the sender's line of gaze, and may be

superfluous in light of comments by Vine (1971) and others (Argyle, 1970; Exline & Fehr, 1982) who contend that in natural settings, interactants look at another's face or well away from each other. Goodwin (1981) noted that a change in gaze is nearly always accompanied by a change in head orientation. As Exline (1972) argued "where the receiver thinks the sender looks is more important than where the sender does precisely focus (p.204)." Validity of observer measurement improves with training (von Cranach & Ellgring, 1973). For more precise measurement of gaze there are oculometers that permit moment-to-moment tracking of eye movement with minimally obtrusive head gear. Finally, in recorded interactions, the obtrusiveness of the camera resulted in decreased participants' gaze, more face self-touching, and more anxious feelings. Covert recording is often permitted by present-day research ethics, provided the benefits outweigh potential harm, and in such studies very few participants indicated concern or refusal (Exline & Fehr, 1982).

Specific Recommendations for Coding Gaze

Exline and Fehr (1982) list the following recommendations for obtaining valid and reliable data for gaze:

1. Have dyad members face each other directly.
2. Place observers or TV cameras directly behind receivers.
3. Keep the sender-receiver distance as small as possible.
4. Test the visual acuity of observers.
5. Train the observers with feedback trials.
6. Have some eye level lighting to reduce shadows in the eye socket.
7. Obtain reliability estimates from all observers.

> 8. Schedule fatigue breaks into coding sessions. Observers may relieve the eye strain associated with long-term focusing on the eyes of a sender by moving their heads while keeping their eyes focused on the target. The head movement changes the muscles used for focusing (p.125).

The specific methods of recording gaze data are guided by expense, variables of interest, measurement context, and investigator's skill with complex technologies.

Conclusions Regarding Proxemic, Body Movement, and Gaze Coding

This overview of studies on body movement, proxemics, and gaze was intended to provide information on the methods of coding and the descriptions of coded behaviors that have been used previously by investigators. The extensive, though noncomprehensive, reviews of each section were offered to guide the researcher in determining appropriate variables for study. In summary, the coding strategies for body movement reveal the following:

1. Proxemics – With respect to proxemic behavior a reasonably well-defined system seems to have evolved (Watson & Graves (1966) using a variation of Hall's (1963) coding scheme. Subtle fine-tuning may be necessary to help establish more accurate distinctions for levels of a few of the proxemic codes (e.g., olfaction, visual clarity). Sommer (1969) and Hayduk (1981b) suggested some excellent ideas for studying spatial arrangements in "semi-fixed" space, but considerable development is necessary to measure such variables as intrusion, boundary markers, and seat placement at meeting sites. Lastly,

greater methodological development is necessary for reliably determining "approach distance" (Aiello, 1987; Hayduk, 1983).

2. Kinesics – Trunk Positions – Coding methods for body movement in general lag behind proxemic, gaze, facial, and vocal measures, and this is most apparent in strategies for recording body posture and realignment. A great majority of the studies coding posture, body position, or posture shifts were significantly lacking in definition and precise labeling of the behavior in question. "Postural shifts" might refer to change in trunk position in one study and changes in arm/leg posture in another. Coding of trunk position (e.g., forward lean) and trunk orientation (i.e., degree to which one faces interlocutor) both need to be coded when determining the angle of the trunk with respect to other interactants. Both represent different dimensions of the frontal body surface (i.e., torso front from neck to waist), and both relate to the distance between interactants. Measurement of trunk angle (i.e., degree of torso tilt from the hips) could benefit from greater precision with regard to the forward-backward, and side-to-side angles. While codes representing the degree to which the frontal body surface (i.e., trunk orientation), is turned directly toward another lack a broader range of interval codes than the two or three gradations typically found in investigations (e.g., 0, 45, or 90 degrees), increased precision may not be warranted as typically people tend to face one another within a small scope of possible orientations. It may be more beneficial to determine how orientation, lean, distance, and gaze combine to show attention, interest, positive regard, etc.

3. Kinesics – Arm and leg positions suffer from a lack of comprehensiveness in labeling and description of various alignments, but also, and more critically, when arm and leg positions are coded they are commonly referenced with respect to the degree of "openness" rather than a less biased labeling based on the degree to which the hands, arms, legs, or feet meet, intersect, or are intertwined; appendages could be described based on whether or not they meet (e.g., hand on hand), are in a parallel or symmetrical position (e.g., arms on arm rests), or crossed (e.g., legs crossed, knee on knee). "Open" positions imply to some the notion of being unguarded or accessible, whereas "closed" postures imply to some protectiveness, reticence, and unrevealing obstruction. A hand-on-hand posture appears considerably different than arms folded across the chest, yet in some studies both are considered "closed" postures. It may be more instructive to more fully describe the specific position, e.g., right arm bent at elbow with chin on palm, left arm on armrest.
4. Kinesics – Hand Actions – While there is considerable creative work being conducted on hand gestures (i.e., illustrators) with regard to function, meaning, and timing, other hand actions need further development with respect to coding. Information on the function, connotation, and implication of self-touching, for example, could benefit from more specificity in the type of action (e.g., scratching, rubbing, picking, arranging), area touched (e.g., nose, arm, hair, clothing), and duration of the self-touching. Similar information can be added with respect to objects manipulated in a non-task manner (e.g., fingering a paperclip or pencil). There is very little mention in coding body movement of

the actions involving the feet. Shoulder shrugs are not often included in studies in which body movement is coded, the exception being studies on cultural emblems. Although shrugs, object manipulations, head cocks, and other movements (i.e., head dip or head toss) may be displayed less commonly compared with hand gestures, self-touching, or head nods, such actions may contribute to our understanding of human body movement when they are combined in patterns with other actions (e.g., shoulder shrug with head tilt and lip purse) or in assessments of total activity.

5. Kinesics – Head Actions - Head movements also suffer from shortsightedness in definition clarity where head nods and shakes are assumed to be interpreted similarly by investigators, but as this review indicated, bringing the head in a downward manner without then raising the head was counted as a head nod, and head shakes have been defined as "negative head nods." There is little mention of head tilts or cocks where the angle of the head and shoulder is reduced, nor is there much attention given to the various slight circular and left-right movements made by speakers and listeners, except in studies on synchrony.

6. Gaze Behavior – The methodology and design strategies for coding gaze behavior outlined by Exline and colleagues (Fehr & Exline, 1987; Exline, 1972; Exline & Fehr, 1982) often have been adopted by others, or are quite similar, and represent the most valuable consideration of the relevant aspects of coding gaze.

As is readily apparent, significant methodological work remains for coding body movement: a) precise definitions for and labeling of the coded behavior, b) greater

uniformity in the methodology for and process of coding various behaviors to permit comparability of research results, c) elaboration of methods of training and re-training of coders, and d) greater uniformity in establishing reliability (see below) of the coded behaviors, to name a few areas requiring further development.

Selecting Measures of Body Movement – Decisions

Several questions arise for the researcher who is interested in coding body movements for research purposes. The first decision concerns how body movement variables will be used: 1) as a dependent variable to reflect changes in some characteristic of the encoder such as emotional state, personality structure, social role, status, or attitudes or motives regarding others or about objects/concepts, or 2) as an independent variable where body movements are manipulated to observe the effect on participants. For example, in deception studies the dependent variables might be the frequency of selected body movements exhibited by deceivers and nondeceivers. Similarly, the precise location and duration of selected body movements might be determined for conversational participants to better understand speaker turn exchange. As independent variables, certain body movements might be selected to represent different levels of encoder features such as empathy, friendliness, deception, arousal, dominance, etc. in order to observe the effect on participants' behavior, or ratings of encoders. A researcher may be interested in the types of listener behavior most likely to elicit specific information from the speaker, and so might compare and contrast the rate of head nodding, the amount of gaze, or the frequency of hand gestures.

There are further decisions which must be made for either type of study where body movements are used as variables. For studies in which body movements are counted to compare some feature of the encoder or the situation, the movements selected to reflect the researcher's question must be determined with care.

The research hypotheses also drive the selection of the level of analysis of the body movements: microscopic or macroscopic. Microscopic measures typically include small, fine-grained movements of the head, fingers, gaze, or body and may be related to changes in the speaker's stream of speech, to interactive courtship signals, or to subtle changes in a psychotherapy setting. Macroscopic measures include large scale, molar behaviors such as postural changes, hand gestures, and head nods. An intermediate level could include macroscopic behaviors and some finer movements of the head and hands. The level of analysis needs to reflect the type of information to be gained by coding body movement.

Along with the level of analysis is another significant measurement issue, the time interval for the coded behavior. Researchers code behavior with respect to frequency counts or the duration of time that a behavior lasts. While both are highly correlated, each offers different information: how often a behavior occurs versus how long a behavior is present. Certainly it is far less time consuming to code the frequencies of various behaviors which can be tallied on paper or keyboard entries. It is more difficult to record duration (i.e., time a behavior begins until it ends), but durations also can produce frequencies, and often it makes sense to code durations rather than frequencies for those behaviors which are infrequent but enduring. For example, an individual may display one self-touching on the hand (e.g., scratching, rubbing) that lasts several tenths of a second

or continuously rub or stroke the hand for a significant portion of the total time. Likewise, a seated person may swing her/his knee-on-knee crossed leg continuously or several times briefly during the course of an interaction. In sum, the time interval chosen for coding behavior depends on the researcher's question, the number of behaviors included, and the resources available for coders.

Future Work in Body Movement Coding

As this chapter has shown there is much work that needs to be accomplished on coding body movement, specifically kinesics; coding is less of a problem in the areas of proxemics and gaze. Development of coding methodologies and instrumentation is one obvious area of needed upgrade beyond our current state of investigation. Research results accrued across various labs can be more easily compared when variable definitions and labels, coding techniques, and estimates of reliability are similar. Such an integration also would be of great benefit to new researchers. In our lab, we have continually refined a coding system and process which incorporates aspects of several available systems. Our manual includes variable lists and definitions, methods for coding, training coders, information on frequencies and durations, and locating the behavior with respect to the speech stream or other movements (Harrigan & Carney, 2005). Body positioning and actions, proxemic and gaze measures are included.

(Insert Table 4.2 about here)

In addition, the work of Blascovich, Bente, Frey, and others using computer simulations, virtual environments, and robotics offers a unique opportunity to examine movements of encoders, interactions of participants, and perceptions of decoders with

greater consistency and presentation of stimulus materials. There are significant advances in technologies for the face and voice (e.g., voice and face recognition and simulation) which have been built upon the precision of findings in these research areas. Computer digitalization of data could afford access for analyses of combinations of various movements, as well as offer the opportunity for comparisons across research labs.

Finally, a domain of body movement research that has been sadly neglected is the development of theoretical viewpoints on the function, patterning, and interaction of actions and positions. This oversight may have arisen because of the lack of specificity in coding various movements. Overall, there is ample opportunity for research work on methodology, instrumentation, data storage and comparison, in addition to areas of specific interest with respect to kinesics, proxemics, and gaze.

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BOX 4.1 *Emblems in Different Cultures*

Investigators have reported lists of emblems for a variety of other cultures (Barakat, 1973; Creider, 1977; Ekman, 1976; Morris, Collett, Marsh, & O'Shaughnessy, 1979; Saitz & Cervenka, 1972; Sparhawk, 1978). Emblems are defined similarly by other researchers and are labelled: semiotic gestures (Barakat, 1973), formal pantomimic gestures (Wiener, Devoe, Rubinow, & Geller, 1972), expressive gestures (Zinober & Martlew, 1985), autonomous gestures (Kendon, 1983), and symbolic gestures (Kraus, Chen, & Chawla, 1996; Ricci Bitti & Poggi, 1991).

BOX 4.2 *Functions of Illustrators*

The function of illustrators is complex, and research has been focused on several perspectives. Illustrator frequency was related to psychopathology, deception, and ratings of the encoder's personality (Ekman & Friesen, 1969a; 1977; Ranelli & Miller, 1981). A common theme of hand gestures is function: to aid listeners' understanding of the speaker's remarks, to help speakers' produce speech, or to assist both. Speakers displayed illustrators more often when a listener was present (Cohen & Harrison, 1973; Mahl, 1961), and while these actions seemed to aid listeners in understanding complex descriptions (Cohen, 1977), this notion is far from clear (Feyereisen & deLannoy, 1991; Kendon, 1994; Krauss, Dushay, Chen, & Rauscher, 1995; Krauss & Hadar, 2001; Rimé & Schiaratura, 1991 as speakers also displayed a high frequency of gestures when listeners were not present (Cohen & Harrison, 1973).

At the Columbia University CommLab, Krauss and colleagues have conducted extensive empirical research on "conversational gestures", and distinguished two types: motor movements and lexical movements (Krauss et al., 1996). The former represent actions in which the "hand shape remains fixed during the gesture, which may be repeated several times (p. 393)." These are similar to Ekman and Friesen's (1972) "batons" and Kendon's (1983) "beats." Like Ekman and Friesen (1969a) and others (Kendon, 1983), Krauss and associates define "lexical movements" as actions that "vary in length, are nonrepetitive, complex, and changing in form …and appear related to the semantic content (Kraus et al., 1996, p. 393)." Three criteria are used to show the relation of gestures to speech: 1) these acts do not occur without speech and are only made by speakers, 2) they are "temporally coordinated with speech", and 3) are "related in form to

the semantic content of the speech they accompany (Kraus et al., 1996, p. 392)." Although the pervasive belief is in the "gestures as communication" hypothesis (i.e., gestures help communicate information to listeners), supportive empirical evidence is minimal. Researchers have shown that listeners were better able to draw figures from descriptions by speakers who were permitted to gesture (Graham & Argyle, 1975) or guess objects based on speakers' descriptions (Riseborough, 1981), but success was marginal and limited. Krauss, too, demonstrated that judges were able to draw parallels between a gesture and it's "lexical affiliate" (i.e., word/phrase associated with gesture), but only with gestures involving "locations" or "actions" compared with "objects" and "descriptions" (Krauss, Morrel-Samuels, & Colasante, 1991).

Based on their results Krauss and colleagues contend that gestures convey a limited amount of information to listeners, but were useful for speakers (Hadar, Wenkert-Olenik, Krauss, & Soroker, 1998; Krauss & Hadar, 2001). For example, speakers had more difficulty retrieving lexical items to describe what they had previously viewed if the speakers were prevented from gesturing, but lexical clarity and speed was considerably better when they were permitted to gesture (Krauss et al., 1996). Preventing speakers from displaying gestures either resulted in speech disfluencies (Rauscher, Krauss, & Chen, 1996; Rimé, 1982) or had little effect on speech production (Graham & Heywood, 1976). Not surprisingly, Krauss et al., (1991) found that gestures presented without speech resulted in less communication accuracy than when accompanied by speech. Interestingly, aphasics with word retrieval problems gestured more than normals or aphasics with conceptual problems (Hadar, Wenkert-Olenik, Krauss, & Sorokoker, 1998), and training aphasics to exhibit gestures helped their word retrieval (Hanlon,

Brown, & Gertsman, 1990). Dittman and Llewelyn (1969), like others (Christenfeld, Schacter, & Bilous, 1991; Freedman & Hoffman, 1967), observed a higher frequency of gestures when word retrieval failures occurred, and posited a tension reduction hypothesis in which gestures helped alleviate tension generated by word retrieval difficulties. Finally, Krauss and colleagues' conjectures regarding the association between speech and gesture as a communication unit may be reflected in the spontaneous gestures congenitally blind individuals exhibit while speaking (Blass, Freedman, & Steingart, 1974).

BOX 4.3 *Functions of Adaptors (Self-touching)*

Generally, the most typical explanation for self-adaptors has been an affective one; i.e., these acts are attempts to cope with feelings and emotional states. Self-adaptors provide sensory stimulation and are performed to relieve self or bodily needs, to comfort or irritate, to release emotional arousal or otherwise provide ministration to the self (Ekman & Friesen, 1969b; 1974). Ekman and Friesen (1969a) hypothesized that self-adaptors represents unintended "emotional leakage" betraying an individual's aroused affect. These actions have been associated with anxiety, guilt, hostility, suspiciousness and stress (Dittman, 1972; Ekman & Friesen, 1974; Mahl, 1968).

Despite these claims about the function of self-adaptors, there are few direct studies of self-adaptors. In the studies that exist on self-adaptors, the "negative" impression of self-adaptors has not always been observed. For example, confederates who displayed self-adaptors were rated as more likeable, outgoing, honest, and easier to work with compared with those who did not display self-adaptors (Harrigan, Kues et al., 1987), and replicated results showed that doctors and patients who self-touched compared with those who did not were regarded as more expressive, warm, sincere, and natural, though slightly less calm (Harrigan, Kues, & Weber, 1986; Harrigan, Weber, & Kues, 1986). Using contrast analyses, researchers showed that the encoders' role and type of self-adaptor significantly affected decoders' ratings of the individual. For instance, hand-to-hand rubbing by job interviewees and patients was judged as more appropriate than by friends or strangers, and nose rubbing was regarded as warm and expressive compared with hand or arm rubbing (Harrigan, Lucic, Kay, McLaney, & Rosenthal, 1991). These results reflect the fact that the type of self-adaptor was an important factor, as was the

role of the self-toucher and the other behaviors displayed at the same time (i.e., nodding, leg recrossing). The idea of different interpretations for different self-adaptors was revealed by Goldberg and Rosenthal (1986) who classified self-touching based on body area, and found interesting differences for gender, area, and formality of interview, e.g., more upper torso/neck self-touching was displayed by males in same sex dyads.

Freedman and colleagues have developed a compelling theoretical view of hand movements with regard to verbal representation. Accordingly, effective communication requires both the "enactive kinesic system organized toward the representing of thought, and a supportive kinesic system organized toward the attaining of focal attention (Freedman, 1977, p. 111)." The former system is represented by hand gestures, labeled as "object-focused movements, while the latter are termed, "body-focused movements" (i.e., self-touching). Rather, than concentrating on the underlying states, motivations, or feelings of the encoder, or the role of these movements with respect to the speaking-listening roles, Freedman's efforts were to understand these movements in relation to the cognitive aspects of the speech process. "When there is some strain between the image and symbol, the action creates a kinesic experience at the very point at which the arbitrary symbol must be articulated (Freedman, 1977, p.113)." Thus, the gesture helps "buttress the clarity of the image", connecting the image and word.

Whereas object focused movements are elicited by tasks in which participants need to put into words cognitive experiences, body focused movements appear when there is interference in the focus of the speaker's attention or organization of thought (Freedman 1972, 1977). Such soothing, grooming, or rubbing actions regulate sensory input to help the speaker maintain attention and "ward off intrusive cues." Evidence for

these ideas is provided by studies showing that: 1) confrontations with cold interviewers resulted in more body focused movements because interviewers' disinterest interfered with speakers' descriptions of personal events (Freedman, O'Hanlon, Oltman, & Witkin, 1972), and 2) participants who displayed pervasive body focused movements made fewer errors on the Stroop interference test (Barroso, Freedman, Grand, & van Meel, 1978). Freedman (1977) also described developmental trends with respect to the frequency and laterality of object and body focused movements that are intriguing, although short on empirical data. In addition to the speaker's hand movements, the listener's participation in "the process of information filtering and decoding" also may be inferred from body focused movements (Freedman, Barroso, Bucci, & Grand, 1978).

A descriptive study of self-adaptors showed that physicians and patients displayed self-touching differently depending on semantic content, temporal location, and area touched (Harrigan, 1985). For example, self-adaptors rarely occurred during silence, were more frequent during interruptions or speech disfluencies, and physicians were more likely to exhibit a "grooming" (i.e., readjust clothing, hair) self-adaptor as they began interacting with the patient, while patients self-touched more when answering the physicians' questions.

Finally, for Freedman and colleagues, an important distinction is made between brief (i.e., less than 3 seconds), "discrete" body focused movements that appear to have an instrumental function (i.e., scratching the nose), and those of a more "continuous" (i.e., longer than 3 seconds), unpatterned nature (i.e., finger-to-hand, hand-to-body manipulations) (Freedman, 1972; Freedman, Blass, Rifkin, & Quitkin, 1973). For example, higher frequencies of the more continuous, unpatterned (i.e., repetitive and

nondirected) body focused movements (i.e., finger-to-hand) were related to degree of clinical pathology in depression (Freedman, 1972), schizophrenia (Grand, Freedman, Steingart, & Buchwald, 1975), and isolation proneness and belligerence in chronic schizophrenia (Grand, 1977). Similarly, patients' presentation of "hidden agendas" (i.e., patient problem that was not the stated purpose of the appointment and was difficult to express, e.g., unwanted pregnancy, domestic violence, cancer fears) was associated with more body self-adaptors compared with hand self-adaptors (Shreve, et al., 1988).

BOX 4.4 *Research Findings on Head Nodding*

Many and varied research questions have been addressed in which head nods operated as an independent variable (e.g., signaling interest) or a dependent variable (e.g., nodding frequency when lying). A brief review of such studies will illustrate the range of research on nods. As indicated earlier, head nods are associated with listener feedback to the speaker, suggesting that the listener is following the speaker's comments (Duncan & Fiske, 1977; Matarazzo & Wiens, 1972; Rosenfeld, 1978; Rosenfeld & Hancks, 1980; Yngve, 1970). Birdwhistell (1970) offered several forms of the head nod to represent different conversation control functions. There is a substantial literature demonstrating the powerful reinforcing relationship between interviewer head nodding and the amount and type of information provided by clients (Matarazzo, Saslow, Wiens, Weitman, & Allen, 1964; O'Brien & Holborn, 1981; Pope & Siegman, 1972). Head nodding was reflected in positive impressions of counselors and other interactants (D'Augelli, 1974; Förster & Strack, 1996; Fretz, 1966; Harrigan, Lucic, Kay et al., 1991; Hill & Stephany, 1990; Mehrabian, 1969; Seay & Altekruse, 1979), and was exhibited more by those with similar attitudes (Kleck, 1970). Feldman (1985) reported striking differences in head nodding as a listener response by White and Black Americans. Displays of nodding occurred often during settings of approval-seeking (Mehrabian & Ksionzky, 1972; Rosenfeld, 1967), approval-providing (Rosenthal & Jacobson, 1968), and persuasion (Mehrabian & Williams, 1969).

Nodding is regarded as an emblem where the members of the culture displaying it regard it as an affirmative response (Ekman, 1976; Jakobson, 1972; Johnson, et al., Morris, et al., 1979; Saitz & Cervenka, 1972). Gender differences show that females

consistently displayed more head nods than males (Hall, 1984; Jones, Gallois, Callan, & Barker, 1999). Nodding decreased during intrusions (Sundstrom, 1975), conflict (Feeney, Noller, Sheehan, & Peterson, 1999), and social anxiety (Ayers, 1989; Shibata, 1990), but increased when interactants sat close (Kleck, 1970). Like other expressive behaviors, nodding decreased during depression (Ekman & Friesen, 1974) and increased during recovery from depression (Troisi, Pasini, Bersani, Guispini, & Ciani 1989), and greatly increased in psychotic states (LeJeune, 1989). Nodding has been shown to both increase (Buller, Comstock, Aune, & Strzyzewski, 1989; O'Hair, Cody, & McLaughlin, 1982) and decrease (Comadena, 1982; Mehrabian & Williams, 1971) in deception.