

Nonverbal Communication*

A review of research in Germany

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This paper presents an overview of the research on nonverbal communication that has appeared in the German-language literature during the past decade, and gives some treatment of its relationship to *Ausdruckspsychologie*. Empirical studies, recent theoretical issues, and methodological developments are discussed. — Although nonverbal communication often plays an essential role in diagnosis and treatment, it has been widely neglected in academic training for the past 20 years. This inconsistency may partly be due to the outright rejection of the classical *Ausdruckspsychologie* during the 1960's. In order to avoid the fate of *Ausdruckspsychologie*, it will be necessary to extend our knowledge of nonverbal communication by means of further methodological development and empirical investigation.

During the past decade, the area of nonverbal communication has undergone considerable reorientation, accompanied by increasing interest within social psychology. The present review deals mainly with the German-language literature of the 1960's and 1970's; earlier publications, particularly those of primarily theoretical interest, are not always acknowledged.

The review takes up at the point, some time after the decline of *Ausdruckspsychologie* (psychology of expression) when considerable attention was being given to the various aspects of nonverbal behavior. As late as the sixties, classical *Ausdruckspsychologie* represented a major field among German-speaking psychologists, constituting an important part of academic study. Above all, it was widely applied in diagnostics as *Charakterkunde* (characterology). Knowledge of physiognomy, facial expression, gesture and graphology were considered basic tools for the practicing psychologist.

Various fields contribute to the study of nonverbal communication, including psychology, ethology, psychiatry, pedagogy, and linguistics. The methods applied are correspondingly manifold: field studies, observation in quasi-natural and experimental settings, experiments, speculation.

Accordingly, it could hardly be expected that either a unified theory or a set of generalized methodological criteria might have been established. On the other hand, this diversity of influences clearly indicates the continued recognition and wide interest which exist for the phenomena of nonverbal communication.

Origins and Historical Background

Research on nonverbal communication in the German-speaking psychological community has been influenced mainly by three major paradigms, representing (a) classical *Ausdruckspsychologie*, (b) ethology and (c) the Anglo-American research on nonverbal communication.

* This paper is dedicated to Prof. Dr. D. Ploog on the occasion of his 60th birthday.

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Ausdruckspsychologie

Ausdruckspsychologie, the psychology of expression, is based on the academic and cultural tradition of investigation into various phenomena of human appearance and behavior. Although this field is no longer considered to be of importance in academic psychology, its influence persists in the field of nonverbal communication.

Brunswik and Reiter's (1937) experiment on impression formation using schematic faces can be regarded as a classical example in the study of nonverbal phenomena. *Ausdruckspsychologie* however, also covers the field of appearance and human artifacts. Kretschmer's (1921/1967) influential work on body and character remains one of the important sources of typologies of body appearance and their relationship to personality. Klages (1950, 7th ed.) was one of the main authorities on graphology. He compiled a detailed taxonomy of the individual features of handwriting. For many years, *Ausdruckspsychologie* as represented in Lersch's (1932/1943) monograph *Gesicht und Seele* (Countenance and Soul) was definitive for German psychologists. This work presents a detailed introduction to the anatomy as well as to the precise observation and description of facial expression. On the other hand, Lersch offers extensive interpretations with regard to character traits, which often seem highly speculative.

The volume *Ausdruckspsychologie* of the German *Handbuch der Psychologie* (Handbook of Psychology), edited by Kirchhoff (1965), best represents the state of this classical field. Its most important feature is its differentiated classification of verbal and nonverbal expressions of the individual.

The question arises why academic interest in these problems faded and why they became excluded from university training. In the preface to the latest edition of Karl Buehler's (1938/1968) *Ausdruckstheorie*, Wellek describes one major problem of the field. He pointed out that on account of the neopositivists' misgivings with respect to subjectivity, *Ausdruckspsychologie* as part of „phenomenological” psychology was threatened with extinction. Is it the case, as Wellek maintains, that the misunderstanding is the fault of those academics who no longer show interest in the subject?

Various reasons can be found for academic psychology's lack of interest in *Ausdruckspsychologie*:

1. Quantitative measures of the prognostic or indicative value of expression are seldom specified. In the few cases where they are given, only a weak relationship exists between expression and criteria. Subjective knowledge and belief have often appeared to play an important role.

2. Expression is usually analyzed as a static phenomenon, although it has long been recognized that the analysis of dynamic aspects of behavior is essential. It must be remembered that film – and particularly video-recording of behavior has only recently become so generally accessible. Technical difficulties certainly contributed to the limitations of *Ausdruckspsychologie*.

3. An important conceptual difference is that *Ausdruckspsychologie* is principally concerned with the individual. Consequently, it is understood to be the individual who produces an expression and, in turn the individual who understands and interprets this expression and forms an impression from it. Both processes, the production of an expression and the formation of an impression, are examined as isolated phenomena. The relationship between interactants and the mutual influence of their behavior during the course of social interaction is hardly ever taken into account in *Ausdruckspsychologie*. Yet this concept is central to

research in nonverbal communication. It should, however, be mentioned that it is not always done justice to in practice.

To a large extent the rejection of *Ausdruckspsychologie* by the academic community can be traced to its failure to adapt to emerging methodological standards, the persistent practice involving characterological interpretation, introspection, and intuitive understanding being poorly supported by reliability and validity studies.

In *Ausdruckspsychologie*, personality and character were inferred from static facial expression or even from physiognomic features, whereas investigators of nonverbal communication give more consideration to the dynamic aspects of behavior. Thus, the individual's behavior is regarded as an integral part of a social interaction in which the participants may infer motives, emotions, and other internal states, and thus inseparable from the resulting mutual influence.

The basic questions regarding observable behavior remain: What conclusions may be drawn from the behavior about the short and long term internal disposition of the individual and how is this behavior perceived? In nonverbal communication attention is now being directed more towards the course of behavior and the dynamics of interaction between individuals.

Despite the many parallels, research into nonverbal communication has developed more or less independently of *Ausdruckspsychologie*. However, some of the studies reported in this overview on nonverbal communication are actually based on the tradition of *Ausdruckspsychologie*. It would be incorrect to view these highly related fields as being completely separate.

It is not within the scope of this paper to report in detail on the historical development of *Ausdruckspsychologie*. An extensive and thorough survey of *Ausdruckspsychologie* and its relationship to nonverbal communication, has been presented by Asendorpf and Wallbott (1980). In their paper, they discuss theoretical contributions as well as empirical studies on facial, bodily and vocal expression, covering mainly the literature from 1920 to 1960.

The contribution of classical *Ausdruckspsychologie* seems to be particularly in the exact observation and description of nonverbal phenomena. Its theories were strongly grounded in philosophical and literary traditions. It was also associated with ethology, which gained popularity at the same time as *Ausdruckspsychologie* was losing favour.

Ethology

As an intermediate between psychology and biology, ethological research has contributed to the understanding of the phylogenetic and ontogenetic development of communicative behavior. In contrast to *Ausdruckspsychologie*, the international influence of German ethology has been, and remains considerable. There is little German literature on the ethology of communication which is not internationally recognized in the field. Reports are either published in English or the German references are acknowledged. The textbook on ethology by Eibl-Eibesfeldt (1967/1978) has been published in many languages and, needless to say, discusses the German-language literature in detail. It includes more than 100 pages on human ethology, a substantial part of which deals with nonverbal communication.

Human ethology is related to the field of nonverbal communication at a number of levels. Conceptually, human ethology examines the phylogenetic and ontogenetic sources of human behavior, including communicative behavior. Thus,

the development of ongoing behavior is seen as the result of the interplay between innate coordination and acquired socialization. Methodologically, the structure and function of behavior is examined in various species in order to shed light on its origin. The principle of functional shift is used to explain how ritual behavior derives from behavior which was originally necessary for survival. Darwin's book *The Expression of Emotions in Men and Animals*, which was translated into German shortly after its first publication in 1872, represents one of the basic works for the ethological study of human communication.

These fundamental principles have only recently been formulated in relation to nonverbal communication. Ekman (1973), in a volume he edited entitled *Darwin and Facial Expression: a Century of Research in Review*, points out that "although Darwin's book was a bestseller when it was first published, it had little influence on the scientific community over the following 90 years" (p. 2).

The influence of ethology can only be outlined here. Of particular importance appears to be the resonance which the work of German-speaking ethologists, in contrast to *Ausdruckspsychologie*, has found in the Anglo-American community. Ethological concepts of German origin can be found repeatedly in the Anglo-American literature on nonverbal communication.

Research on nonverbal communication

Anglo-American research on nonverbal communication, the youngest of the three approaches discussed in this paper, has had considerable influence on German research. The influence has been strong enough to compensate to some extent for the decline of interest in *Ausdruckspsychologie*. The appearance of Argyle's *Social Interaction* (1969) resulted in considerable attention being given to nonverbal communication in the Federal Republic of Germany. The "repertoire of nonverbal behavior" described by Ekman and Friesen (1969) offered a conceptual framework within which nonverbal behavior could be categorized in terms of its origins, usage and coding. The classic Anglo-American literature has recently been reviewed for the German-speaking community by Scherer and Wallbott (1979). From a historical perspective, they comment on the significance of this literature for research into social interaction.

Theories

The various theoretical approaches to nonverbal communication are perhaps more strongly related to specific research directions in the German than in the Anglo-American community. The external variable and structural approaches, which Duncan (1969) distinguished, can be conveniently allocated to psychology and ethology, respectively. Clinical psychology and psychiatry, which are more concerned with communicative disorders, tend to make use of both approaches.

Graumann (1972) refers to the rapid and eclectic development of the communication sciences. There exist various general theories of communication which are also relevant to nonverbal communication. Nevertheless, Graumann's (1972) statement remains valid: "On the whole, the time has still not come for a comprehensive psychological theory of communication. Rather, it appears at present more opportune to examine the material which, in terms of a psychological perspective, represents a basis for our knowledge of the forms, conditions and effects of human communication." (p. 1179, trans. by the author).

In spite of their many differences, most theories demonstrate some common features, particularly in relation to the function of behavior. Even today, the most comprehensive overview of classical theories of expression are to be found in Buehler (1933/1968); recent additions are discussed in Buser (1973). Buehler (1968) distinguishes between the expressive and the appeal functions of behavior. The expressive function is understood as the experiential aspect, corresponding to what W. Wundt termed "*Spiegelung*", or the mirroring of experience through the body of the subject.

The appeal function is observable in the communicative situation: "The behavior of A becomes socially effective when B responds to some aspect of A's behavior. This is the "resonance" of the receiver to the "sender" (Buehler, 1933/1968, p. 198). Thus, the encoding process in the sender is of major importance for the expressive function, while the decoding process in the receiver is essential to the appeal function.

The distinction between expression and impression made by Leyhausen (1967) in his description of the phylogenetic origins of expression draws from Tinbergen (1952) and Lorenz (1965).

Following Darwin's (1872) principle of antithesis, he states that an expression indicates the effect of the minor of two propensities on the effectors. Given two propensities, the one which is momentarily weaker finds expression. The capacity for impression can also be traced phylogenetically, and is clearly demonstrated by innate releasing mechanisms. It is contended that expressive behavior developed phylogenetically earlier and is, furthermore, more adaptive than the corresponding process of impression. According to Leyhausen (1967, p. 157 ff.) expression and impression have adapted during phylogenesis so that both mechanisms are matched to one another. Both expression and impression processes can be augmented by experience and learning. Furthermore, the intended message must be distinguished from the expressive behavior with regard to both its genesis and function.

The psychobiological standpoint is discussed by Ploog (1972) for intraspecies communication. Thus, during phylogenesis behavioral patterns which were originally of existential importance to the species have become modified, through ritualization, to signals. A functional shift is also involved: for example, the original motivation for the behavior (e.g., body grooming) is replaced by some other initially independent, motivation (e.g., courting behavior). Like Leyhausen and Bühler, Ploog makes a distinction between the two functions. "The communication between partners takes place on the basis of the twofold nature of the communicative behavior, namely the expression of the sender's motivation and the impression formed in the receiver who alters his motivation accordingly" (Ploog, 1972, p. 168, trans. by the author).

Biologically and psychobiologically oriented theories are concerned, above all, with the phylogenesis and ontogenesis of nonverbal behavior. Generally, they derive communicative behavior from that behavior which is essential to the survival of the species. This behavior attains its communicative function primarily by means of a functional shift. In an exaggerated form, this could be stated thus: The individual organism expresses its motivation in a "species-selfish" manner and transmits its disposition to other members of its species via biologically suitable impression mechanisms.

The psychological theories of nonverbal communication also distinguish between expression and impression, although here the terms encoding and decoding of behavior are used, or the sender and receiver function are specified. The con-

cepts and terminology of telecommunications can be usefully applied where the emphasis is placed on the exchange of messages, e.g. communication channel, sender, receiver, signal, etc. Communicative disorders can thus be referred to in terms of encoding and decoding errors.

The phylogenetic development of communicative behavior is understood by v. Cranach (1971a) to be exhibited in structural and functional changes in behavior. However, he views the functions of nonverbal communicative behavior in closer relationship to language. Accordingly, he distinguishes the function of messages about the disposition of the sender, the "speech-supporting" function and the "speech-equivalent" function. The speech-equivalent function refers to the vicarious occurrence of nonverbal behavior instead of speech itself. These include, for example, emblematic gestures which have unequivocal meaning. An example of the speech-supporting function can be seen in sender-related gestures, or "illustrators", which emphasize or clarify the verbal content. On the other hand, those behavioral patterns which regulate the communication process are known as "regulators". These can seldom be replaced by verbal signals.

The function of messages about the disposition of the sender correspond to the "expressive function" described by Buehler (1933/1968) although here the emphasis is on the social reference: "Above all, those affects, interpersonal attitudes, and cognitive, motivational and emotional attitudes of the sender are communicated which relate to the definition of the situation, the social relationship, and his own role" (v. Cranach 1971, p. 141, trans. by the author).

Most of the possible functions of nonverbal behavior during conversation have been categorized by Scherer (1977b). Following the semiotic classification, he distinguishes parasyntactic, parasegmentic and parapragmatic dimensions, and introduces a further "dialogic" function of nonverbal behavior. As parasegmentic functions, he includes: substitution (e.g., emblems), amplification (e.g., illustrators), contradiction (e.g., the double-bind situation) and modification (e.g. weakening by means of interaction) of the verbal content. He treats as parasyntactic functions the segmentation of the speech flow and the synchrony of various behavioral levels. The most important functions which are understood as parapragmatic are expression and reaction to the partner's utterances. Here again parallels to the expression/impression dichotomy are to be found. Reaction functions are further classified into signals of attention, comprehension and evaluation, with reference to the observable behavior of the partner rather than to the process of impression formation. Finally he describes the dialogic function as the regulation of the course of dialogue and the definition of the relationship between the participants.

A differentiated model of the encoding and decoding of social signals has been proposed by Scherer (1974a; Wallbott & Scherer, 1977). This represents a modified Brunswik lens model, according to which personality features and psychological disposition are externalized in distal indicators (e.g. voice quality, manner of speaking, gestural and facial behavior). Furthermore, these distal indicators are perceived by the observer in the form of proximal percepts so that conclusions and attributions are determined by means of inferences. Scherer (1977b) emphasizes these as a specific property of nonverbal communication: in contrast to verbal behavior, nonverbal communication is more ambiguous and more negotiable, i.e. the possibility remains of disputing whether a particular behavior occurred, was intended, or had a particular meaning.

Recently, the linguistic-phonetic disciplines have also contributed to the theoretical discussion on nonverbal communication. In a theoretical paper, Unge-

heuer and Wegener (1977) take phonetic aspects into consideration, and Lange-Seidl (1975) has presented a semiotic approach to the theory of nonverbal signs.

Summary

The development of a theory of nonverbal communication is in the fortunate position of being young, flexible and able to profit from many influences, interest being shown from the fields of linguistics, sociology and semiotics. — The questions relating to the phylogenetic and ontogenetic origins are being dealt with by ethology and psychobiology. The psychological approaches are concerned with psychological, social, and cultural factors in human communication. They have in common the special reference to the exchange of social information, sender and receiver functions, processes of expression and impression, and appeal and signal functions. These various approaches remain necessary for an adequate treatment of the phenomena in nonverbal communication.

Aspects, methods, and results

The term *nonverbal communication* is directly associated with phenomena such as facial expression, gesture, body posture, eye contact, and interpersonal distance. If one also includes speech activity and voice quality then a fairly comprehensive coverage of nonverbal phenomena is represented.

In addition to this classification, it is useful to distinguish between sender and receiver within the communication system (cf. Scherer, 1970, p. 3 and p. 93). On the one hand, it is convenient for the communication-theoretic aspects of social interaction to consider sender and receiver of social signals as one whole system. On the other hand, it is necessary to separate the sender and receiver functions. According to Leyhausen (1967), many studies and concepts in classical *Ausdruckspsychologie* suffer from the confusion of these two aspects. In the case of the "dimensions of facial expression" for example, the "impression" is examined experimentally; the "development of the expression" is confused with the ontogenesis of the "comprehension of the expression" (p. 130 ff.).

The various features of nonverbal behavior will be dealt with here separately. It should of course be remembered that human communication does not take place exclusively in any one of these channels. Single-channel analysis is necessary to establish basic properties; however, the coordination of the various behavioral aspects constitutes the process of interaction. Multichannel analysis (cf. Scherer, 1970) represents one approach in which several behavioral aspects are simultaneously measured.

Facial expression

The wide variety of possible interpretations of facial expression is equalled by the number of approaches which have been reported. These range from quantitative microanalysis of single features to the ethological description of complex behavioral patterns involving facial expression.

The social-signal function of facial expression was recognized by Darwin (1872) and has been taken up recently in the American literature by Ekman

(1973). Darwin's concepts have, by contrast, been given repeated mention in German literature. Buehler (1933/1968) dealt with this approach in his standard work on *Ausdruckstheorie* (the theory of expression), and Lersch (1932/1943) referred at length to Darwin's work.

The fact that differentiated facial reactions are to be found in other species has stimulated many comparative studies (Leyhausen, 1967; Ploog, 1969, 1972). According to ethological theory the expression prompts an impression in the social partner via stimulation of innate releasing mechanisms (after Tinbergen, 1952).

Ploog (1972) has discussed the fundamental role of facial expression in human social development in relation to the hypothesis that the degree of maturity of nonverbal communication can be seen in relationship to the process of speech development. On the basis of ethological observation of facial signals in monkeys, he describes possible ontogenetic processes of biological maturation for human facial expression. He refers to Eibl-Eibesfeldt's study of the behavior of children born deaf and blind, who could produce the facial expressions corresponding to smiling and weeping. The surrogate experiments of Ahrens (1952) on the development of facial recognition in human infants may be interpreted similarly: At a very early age it appears to be sufficient to present a few distinct points to the infant in order to stimulate smiling. At the age of 6 months, a pattern involving a stylized face with a broad mouth is necessary to stimulate smiling. After 8 months the reaction occurs only when a full facial expression is presented.

One example of complex social behavior in which facial expression plays a major role is greeting behavior. In a comparative study Eibl-Eibesfeldt (1968) demonstrated the structural similarity in various cultures of the eye greeting which can be made with a social partner across larger distances: this involves raising of the head, raising of the eyebrows, smiling and then a slight lowering of the head.

Leonhard (1968) gives a detailed description of human facial expression, also drawing from Darwin. He orders the 49 "features" according to the facial regions are associated with different emotions. In Leonhard (1968), photographs recently in Ekman, Friesen and Tomkins (1971), the various facial areas are discriminated during observation. It is also postulated that the different facial regions are associated with different emotions. In Leonhard (1968) photographs are given which exemplify the facial expressions and gestures. The interpretations are validated by intuition and evidence. Many of the examples are photographs of psychiatric patients.

A collection of facial reactions associated with classic psychoses has been assembled on film by Kirchhof (1969). The material was filmed in a psychiatric clinic in Turkey and is organized according to psychiatric diagnostic criteria. The film can be borrowed from the *Institut für den wissenschaftlichen Film* in Goettingen. An accompanying brochure gives short case histories and descriptions of the nonverbal behavior of interest.

Facial expression is clearly of significance as a social signal in stutterers. In a study of social interaction between stutterers and normal speakers, Krause (1978) found that stutterers show reduced facial expression. An early version of the facial action coding system developed by Ekman and Friesen (1978) was used. When, during moments of stuttering, facial expression occurred, it appeared in an exaggerated and rigid expression of affect. Furthermore, it was found that

the stutterers appear to induce an increase of back-channel behavior in their partners, e.g. smiling, nodding and directed attention.

Decoding facial expression. Analysis of the process of impression formation can be carried out by presenting stimulus material to observers and determining — perhaps by means of rating scales — the expressive features which are registered and the impression which they make.

Using composed photographs, Kleiter (1973) examined agreement between subjective and external ratings of facial reactions. For this purpose he used a hidden camera to photograph 72 schoolgirls in brief situations, designated as success, failure, attentiveness, and disgust. The actors also rated the intensity of the experienced affects afterwards. A total of 14 composed portraits were constructed, corresponding to photographs of those actors from each situation who gave equal ratings. The composite portraits were then rated by a group of observers according to the emotion or situation which they were seen to reflect. The agreement was not very high for those cases where the actors' subjectively rated intensity was weak, in contrast to the cases where the actors had experienced a high level of affect.

Another rating study of the intensity of impression was carried out by Schuele (1977). Subjects were presented with portrait photographs involving eight facial expressions such as anger and joy. The subjects were requested to rate (a) the general "expressive intensity", (b) the intensity actually experienced by the actor and (c) the extent to which measurable changes in the face could be seen. It was found that the rating of the general intensity correlated to some extent with that of "measurable changes" ($r=.60$), whereas no relationship was found to the intensity actually experienced ($r=.20$). Schuele (1977) concluded that the intensity of expression is estimated mainly on the basis of directly observable changes in the face. In a more general article based on the phenomenological standpoint, Schuele (1976) discusses how expression is perceived in both short-term mimicry and the long-term physiognomic features of the face.

The contribution of facial expression to the decoding of verbal information was examined by Siddigi, Schwind and Voss (1973). Tape recordings, films, and sound films were produced which contained sentences with positive, negative, active, and passive content. The sentences were spoken with consistent and inconsistent modulation. These were then rated by a population of 320 students using a semantic differential. They were instructed to rate the semantic content, the voice and the facial expression. According to the results of an eight-way analysis of variance it appeared that for the rating of positive and negative content the voice modulation is more important, whereas for the rating of active and passive emphasis the facial expression is the main source of information.

The relative weighting of various expressive features for personality rating was examined by Dzida and Kiener (1978). The voice quality, gait, portrait photograph and handwriting were used to rate personality according to extraversion, aggression and intelligence. Self rating and IQs were taken as external criteria. The results indicate that the portraits had no influence on the personality rating. The rating of extraversion on the basis of voice quality was found to be valid ($r=.45$).

Procedures for the description of facial expression. There have been repeated attempts at objective observation and quantification of facial expression. The description of elementary, visible muscle changes in the face, for which Hjortsoe (1970) presented a comprehensive system, and which Ekman and Friesen

(1978) drew from, goes back to the work of Duchenne (1876). Duchenne's observations, of which Darwin was aware, involved electrophysiological stimulation of single muscle groups in the human face. In this way he was able to produce "synthetic" facial reactions.

Can the magnitude of changes in facial expression be measured directly and thus quantified? A method for the quantitative analysis of facial movements has been developed by Heimann and Lukacs (1966). A film recording of the frontal face is projected and two axes are laid across the static parts of the face, i.e. a vertical axis is drawn through the nasal root and a horizontal axis is drawn through the inner corners of the eyes. The corners of the mouth and the inner eyebrows are marked as movable points. Various parameters can be derived and expressed in coefficients which describe the degree of symmetry and the magnitude of facial expression. Heimann and Lukacs (1966) give examples of application in pharmacological and stress studies in which their method proved to be valid.

Summary. The analysis of facial expression will most likely continue to be hindered by the fact that observation is difficult and time-consuming. Furthermore, the observer must learn to perceive fine changes in the face. The "naive" observer can provide some descriptive information in terms of a general impression, but detailed analysis requires trained observers. More studies besides those on decoding of facial expression would appear necessary which consider the communicative aspect, i.e. the mutual influence of interactants by means of facial signals. The methodological groundwork for such studies has undoubtedly been improved in the last few years. Nevertheless, the observation techniques still appear too inadequate, too complex, or too laborious for the study of facial encoding as it is involved in mutual influence during communication.

Gaze

As early as 1885 Magnus examined the "language of the eyes" with respect to the information which can be obtained from the gaze behavior of the individual. However, the communicative function of gaze has only recently been studied in detail, summarized in Argyle and Cook (1976).

Functions of gaze. In his analysis of the various functions of gaze during interaction, v. Cranach (1971a) draws from the observations and concepts of Kendon (1967). Von Cranach distinguishes between functions of gaze in the receiver and those in the sender. In the receiver, gaze can be understood as an innate releasing mechanism; this is clearly observable in mother-infant interactions. Gaze has also been recognized as a distance-regulating signal, for example, in maintaining the equilibrium of intimacy between two persons (Argyle and Dean, 1965). Finally information on the attention structure in groups can be established from their gaze behavior. The sender can indicate by means of his gaze behavior that he is ready to communicate. Gaze avoidance in autistic children can thus be interpreted as an unwillingness to communicate. The sender can also contribute to the coordination of the partner behavior by means of his gaze behavior. A final example is the function of gaze as a component of the greeting behavior described by Eibl-Eibesfeldt (1968).

The reinforcing function of being looked at was verified experimentally by Holzkamp (1969). In a dyadic situation, the subjects were required to compare the sizes of round and angled shapes, and select the larger (whereby the shapes

were actually of equal area). It was found that "friendly" rather than "unfriendly" behavior on the part of the instructor did not affect the preference for round or angled shapes unless combined with increased gaze.

The effect of various social stimuli on gaze direction and blinking has been examined by v. Cranach, Schmid, and Vogel (1969). In these experiments it was found that blinking occurred more often when gross changes in gaze direction occurred, which indicates that blinking aids perceptual constancy. It was also found that increased blinking occurred when persons, rather than objects were being looked at. The function of gaze as a social signal is discussed in this connection.

Ellgring (1975b) found that gaze is dependent on both the short- and the long term internal disposition of the individual. It was demonstrated experimentally that the coordination between gaze behavior, cognitive processing, and speech (Ellgring, 1975a, in press) is regulated so that looking away from the social partner occurs when the subject concentrates on the solution of a verbal task (cf. Day, 1964). Thus, when the subject is requested to construct a sentence around two specified words, the following behavioral pattern is observed: gaze at the instructor during instruction, then increasing gaze away during the latency period before the answer, and finally increasing gaze at instructor again while the answer is being given. These patterns in gaze behavior are also present when using a light display instead of a social partner. Although the probability of looking away from an information source was found to increase with task difficulty, the same behavioral pattern was observed. It appears that relevant visual information, social or otherwise, is avoided in those instants when the individual is occupied with speech preparation or speaking (Ellgring, in press). The social partner, or receiver, can often determine from this behavior whether the sender wishes to yield the floor, or is thinking something over.

The concepts of reduced reception of information can be applied in connection with results found with depressive patients. Longitudinal studies of depression have indicated that the relative amount of gaze at partner correlates with the subjectively rated well-being of the patient (Ellgring, 1977; Ellgring and Clarke, 1978). This can be interpreted in terms of a performance capacity which is limited during depression so that the reception of visible social information is reduced.

Gaze and Distance. It appears that gaze behavior and interpersonal distance between mother and newly-born infant quickly become stable. Schoetzau and Papousek (1977) observed mother-infant interaction during feeding and swaddling. They found 85% to 90% gaze at the baby and a mean distance of 22.5 cm. These results were relatively constant in both situations. No significant difference was found between mothers with their first-born and mothers of more children.

Castell (1971) observed autistic, cerebrally damaged, and normal children in various experimental conditions. All children were found to reduce the interpersonal distance when looked at by an adult, indicating that nonverbal contact is associated with a reduction of distance. This does not agree with the equilibrium of distance and gaze postulated by Argyle and Dean (1965).

The "most comfortable distance for observing social objects" was investigated in three studies by v. Cranach, Frenz, and Frey (1968). As part of what was introduced as a perception experiment, subjects were requested to observe male and female persons, photographs of the same persons, and a photograph of a telephone. It was found that the subjects went closer to the persons than to the

photographs. Male subjects went closer to the female persons than to the male. There was also a tendency to move closer to a person when being looked at. These results also contradict Argyle and Dean's (1965) equilibrium model. Von Cranach et al. (1968) offer an alternative explanation based on the different stimulus conditions and their possible interplay with the motivation of the subjects. The concept of "intimacy", as proposed by Argyle and Dean, seems questionable. It seems likely that the postulated effect of the competing forces, inhibition and interest, together with other factors, plays some role.

Coding and observational accuracy. How accurate, i.e. how reliably and validly can the direction of gaze be determined by an observer? Krueger and Hueckstaedt (1969) approached this question by having a sender focus on defined points on and around the face of a receiver. They recorded the points at which the receiver, or an independent observer, registered either eye contact or gaze at the face. It was found that even at a distance of 80 cm direction of gaze within the face of the receiver could not be distinguished adequately. Furthermore, even when the receiver was merely required to determine whether the gaze was directed at his face, there was a high error rate. An observer who was positioned behind or to the side of the receiver had a substantially higher rate of error. It was also found that the head position of the sender and the personality of the receiver had some effect on the ratings. In a further experiment, Ellgring (1970) obtained similar results: Only a small proportion of the available signal information is decoded correctly by the receiver. A greater distance between persons reduces the proportion of decoded sender information. Extraverts were found to give fewer correct ratings than introverts.

The results of these investigations most likely specify a lower limit for observational accuracy. Thus, some skepticism appeared to be justified regarding our ability to recognise "eye contact". It seems advisable to use the term "looking at" and to limit oneself to recording "looking at the face" instead of "eye contact". The term "eye contact" is, however, so current, that its use will most likely continue. In sum, caution should be exercised in assuming that eye contact can be recorded reliably and validly.

A method for the binary coding of gaze and speech is proposed by Wagner, Clarke and Ellgring (1980) which allows the description of dialogues according to sixteen complex, discrete states with regard to their durations and sequences.

Summary. Studies of gaze behavior have mostly been concerned with the social-regulative and indicative function of this behavior during social interaction. From the methodological studies concerning observation and measurement procedures it may be concluded that some caution is called for when referring to "eye contact". There remains little doubt, however, that gaze is central to social interaction, and that some of its aspects can be assessed with sufficient accuracy.

Gesture, Posture and Body movement

Various interpretations have been offered with regard to the gesture, posture and body movements studied by nonverbal communication researchers. Gesture is often understood in its functional relationship to speech. On the other hand, posture and body movement are most often assumed to reflect the relationship between interactants and the general arousal of the individual. According to Leonhard (1973) innate gestural behavior should be distinguished from those gestures which are learned. This corresponds roughly to Ekman and

Friesen's (1969) distinction between illustrators and emblems, although they do not comment on ontogenetic development. Leonhard (1968) describes a variety of gestures of the face, head, corpus and arms from a phenomenological standpoint.

A classification system for the functional aspects of hand movement has been proposed by Scherer, Wallbott, and Scherer (1979), based on the concepts in Ekman and Friesen (1969). A manual is available (Wallbott, Scherer and Scherer, 1978) which describes the system in detail. The initial results indicate that some relationship exists between personality and the use of specific hand movements (Scherer, 1979; Scherer and Scherer, 1979; Scherer, Wallbott, and Scherer, 1979). Interaction between civil servants and members of the public were videorecorded in office and laboratory situations. Verbal and nonverbal behavior were examined according to a multichannel approach. It was found that extraverts use more head movements when listening; those persons with high scores on a Machiavellism scale tended to produce less "task-oriented" hand movements. Dominant civil servants used more illustrative gestures and showed less self-manipulation. The attribution of personality properties seems to be dependent on both the type and the frequency of gestures. Those persons who make frequent head movements and illustrative gestures are rated by observers as being friendly and open. A low amount of gesture is associated both with lack of effort and with cautiousness (Scherer 1979, p. 108).

The relationship between depressive illness and particular gestural features has been examined by Ulrich (1977). He makes use of a functional observation procedure, based on that of Freedman and Hoffman (1967). It was found that the frequency of "continuous body-focussed movements" decreased with progressive clinical improvement. This type of hand movement is proposed as an objective indicator of "depressive agitation". On the other hand, "objectfocussed" movements did not increase with clinical improvement.

In a further study on 47 endomorph-depressive patients, Ulrich and Harms (1978) compared 9-minute excerpts from clinical interviews which had been performed before medication had been used, and on the 21st day after medication was started. As was found in the first study, the frequency of body-focussed movement appeared to decrease with clinical improvement. However, in this study the authors observed an increase in object-focussed movements.

Observation and measurement of gesture. Besides the classification mentioned above, other approaches have been developed to describe various aspects of motor behavior. A comprehensive coding procedure for the quantitative description of the total postural behavior of the individual has been reported by Frey (1971; Frey and v. Cranach, 1971). This permits coding of corpus, head, arm and leg position. Movements can then be synthesized from the various positional changes recorded (Frey, 1976). Specific aspects of the analysis are described by Frey, Hirsbrunner and Bieri-Florin (1979). The various positions are defined according to the intended resolution of spatial behavior. The course of behavior is segmented into nominal behavioral units. Operationally defined movements and general movement characteristics are determined through the computation of the temporal sequences of recorded positions. Movement variables can also be displayed graphically. Frey maintains that the coding enables the body positions of one person to be simulated by another. This procedure permits the demonstration of stable interindividual differences with respect to various behavioral parameters (Frey, 1971).

Parts of this system have been applied by Simons (1979) to the study of mother-infant interaction. He examines the extent to which linguistic and motoric behavior is coordinated. The temporal sequences of the various behavioral aspects permit examination of the synchrony.

An approach to automatic measurement of hand movement is reported by Wallbott (in press). This involves frame-by-frame coordinate measurement of video recordings. A vertical axis is aligned with the body axis and a horizontal axis with the body center of the filmed person. A light pen is used for automatic registration. The data obtained can be processed so that qualitative descriptions such as "smooth", "uneven" or "jagged" may be expressed quantitatively.

Summary. Studies of gesture have been concerned with both methodological problems and the investigation of its relationship to psychological variables. Objective procedures for the coding of behavior have been developed. The semi-automatic techniques are notable for their observational reliability and internal validity. It is to be expected that the external validity of these techniques will be examined in the near future. Regarding psychological variables, some relationship to personality patterns appears to exist. Changes in internal disposition during agitated depression are accompanied by changes in gestural behavior.

Speech and Voice

The "nonverbal messages of verbal communication" (Siegman, 1978) can be recorded from the acoustic (vocal) communication channel as on-off patterns of speech and measured in terms of fundamental frequency, intonation amplitude, etc.

Speech. The expression of emotions in speech-pause behavior during psychotherapeutic situations is discussed by Zenz, Braehler, and Braun (1974). It is suggested that this behavior is a function of personality, emotion, and their interplay. In their experiment, 18 students were required to report their associations to the Holtzmann Inkblot Test. Significant interindividual differences were found in various measures of speech behavior, e.g. mean duration of utterance and pause. The authors conclude that the on-off patterns can be used as indicators for the therapeutic process. In a further study of 40 initial interviews, Braehler and Zenz (1977) correlated the speech variables with subjective data from both patients and therapists. The on-off patterns were recorded automatically from the tape recorder. The results showed that patients had a more positive attitude towards the therapist when longer pauses and fewer therapist utterances occurred. Therapists found those interviews more pleasant during which the patients spoke less.

In the longitudinal study on depressive patients mentioned above (Ellgring, 1977) results were found to indicate that speech activity increased with clinical improvement.

In the study of interaction with civil servants (Scherer, 1979) it was found that dominant civil servants make longer utterances, in comparison to "Machiavelian" civil servants.

A formal description has been attempted of the speech sequences recorded during various situations with a group of nine persons (Sievers and Langthaler, 1974). Factor analysis was applied to the data. The article is, however, concerned with the presentation of a formal model.

Pauses. Speech pauses are of interest to researchers from various theoretical points of view. They can, for example, be understood as a segmentation of speech, or in relationship to speech preparation, as an indicator of cognitive processing. Silent and voiced pauses can also have different communicative functions.

Making use of phonetic concepts, Drommel (1974a) considers the function of the pause to be a segmentation signal. Drommel (1974b) includes a comprehensive bibliography of pause research. His own experiments are concerned with listener rating of pauses. The possible interactive or communicative functions are also discussed.

Haenni (1974) examined the function of the speech pause during speech planning. His experiments involved filling speech pauses with acoustic "noise". It was expected that this might cause an increase in pause length. However, despite the subjectively experienced stress, the subjects' pause behavior was not significantly changed. Haenni concluded that speech planning occurs also during speaking and not only during pauses.

The relationship between susceptibility to anxiety and speech delay was studied by Helfrich and Dahme (1974). They found that subjects with a high susceptibility to anxiety made long silent pauses during spontaneous speech more often than those of low susceptibility did.

Voice. Vocalizations are closely related to language. Furthermore, as is the case with other aspects of nonverbal behavior in the human and animal species, they may involve both the expression of emotions and social messages (Ploog, 1969). They can represent both affect calls and vocal emblems (Scherer, 1977a). Scherer discusses the indicative value that voice and speech properties have for the inference of personality, psychopathology and emotional expression. In the same way as for other nonverbal aspects of behavior, he proposes various functions for vocalizations. It is important that these functions cannot be completely defined in the practical situation. Neither in the sender nor in the receiver can the psychological processes and behaviors be attributed unequivocally to the vocalizations.

Scherer (1974) applied a path analysis procedure to the attribution of personality on the basis of voice quality. He processed samples from group discussions by means of a random splicing technique, i.e. a random permutation of taped sequences was made in order to scramble the content. The results of the path analysis indicated that perceived extraversion covaried with vocal effort in American speakers, i.e. vocal effort aroused in the listeners an impression of loudness, from which extraversion was inferred. This was not the case for German speakers and may therefore be culture-specific. For German speakers, it was found that acquaintances' ratings of tendency to enforce opinions and aspirations to dominate correlated with the attribution of these features on the basis of voice samples. Here, the path analysis yielded no unequivocal chain effect.

Is voice rating influenced by one's own vocal characteristics? This question was examined by Bortz (1970). Thirteen speakers read three texts, paying attention to correct expression of the content. These voice samples were rated by psychologists, using a semantic differential. A factor analysis indicated that the most important dimensions for the ratings were dynamic range, evaluation and clarity. The most important result was that those persons with a pleasant, dynamic voice rated the voice samples of others as being in contrast to their own. Those persons with less dynamic, less pleasant voices rated the samples as similar to their own.

Bortz (1971) also examined the possibility of diagnostic evaluation of the voice. He had 15 male schoolboys speak the nonsense syllable "ehfo" with different emotional emphasis, i.e. anger, tenderness, joy and boredom. The voice samples were analyzed acoustically and rated by 20 psychology students. An extensive multivariate correlation analysis indicated that extraverted speakers displayed more differentiated vocal expression, and that persons who expressed themselves flexibly were rated as intelligent, versatile and well-balanced. The voices of persons with a neurotic tendency were positively rated. The results of the acoustic analysis correlated neither with intelligence nor with other personality features.

The classic *Ausdruckspsychologie* approach to the voice is described by Goerlitz (1972) in an extended monograph. He attempts to develop a systematic framework based on the available theoretical and empirical studies. Attention is given to the theoretical analysis of vocal expression. This results in a search for conceptual clarification and an *Ausdruckspsychologie* interpretation of carefully described voice phenomena.

Summary. The measurement of speech-pause variables as an aspect of non-verbal communication requires comparatively little effort. Nevertheless, relatively few investigations of these variables have been reported in the German literature. Because of the advantages of these variables and their significance as indicators in the observation of internal disposition and interaction, they deserve more attention.

Voice analysis requires the equipment for, and knowledge of acoustic analysis techniques. Otherwise, it remains at a purely descriptive level. However, the effort involved in acoustic analysis appears to provide useful features for the understanding of the communicative process, the evaluation of vocal communication, the inference of personality patterns and possibly the evolution of emotion.

Odor

Although the olfactory channel is often mentioned in connection with non-verbal communication (see for example, v. Cranach, 1971; Graumann, 1972), it has seldom been investigated. As yet, only one experimental study has been found in the literature (Hold and Schleidt, 1977). The authors had 24 married couples (in five groups) wear standard cotton nightshirts for seven consecutive nights. The subjects were also requested to wash with the same neutral soap during this period.

In a subsequent group test the subjects were allowed to smell the 10 shirts of their group. This test was repeated after one hour. It was found that the subjects could recognize their own and their partner's shirts. They could also distinguish the sex of the wearer of the shirt; female subjects showed better results in this case. Females described their own smell as pleasant, males more often as unpleasant. The partner's smell was also described more often as pleasant.

Approaches to Multimodal Analysis

The multimodal expression of status relations has been examined by Engels (1976, 1977) and Prose (1977). These studies made use of the concepts developed by Mehrabian (1972).

Engels' (1977) material involved role-playing interactions between two students, or between lecturer and student. Observers discussed and rated those scenes which the actors had found to be "realistic". Observers were able to recog-

nise status inequality more often than status equality. Actors of equal or higher status appeared more relaxed.

Prose (1977) video-recorded the preparation phase of the roleplaying of dyadic situations. The dyads were constituted according to sociometric status and role-taking ability. Prose found, on the basis of the participants' subjective reports, that the interaction could be segmented into five phases. Almost all of the behavioral categories used for rating indicated differences among the dyads.

The study by Dzida and Kiener (1978) on nonverbal decoding suggested that valid ratings were only possible when the voice was taken into consideration. Gait, facial expression (still photos), and handwriting were not found to contribute substantially to the rating of intelligence, extraversion, or aggressiveness.

Multichannel analysis is to be understood as the synchronous measurement of several communicative channels or modalities, such as speech, voice, gaze, or facial expression. The study of citizen-civilservant interaction mentioned above (Scherer, 1979) is an example of this kind of analysis.

A project involving the paradigmatic comparison of various methods of dialogue analysis (Luckman and Gross, 1977), includes an examination of techniques ranging from synchronous microanalysis to global behavioral description. The theoretical and methodological principles on which the research group draw have been discussed by Luckman (1979). The approach to language has been reported by Gross (1979), to vocal expression by Winkler (1979) and to head position and facial expression by Jorns (1979).

One problem has become clear from the work carried out so far: the relationship among the individual aspects of behavior and their communicative functions can only be clearly understood when the properties of these single channels are understood. As far as research strategy is concerned, it should be noted that in recent years the methodologies for the single aspects have advanced considerably and in some cases became rather complicated. Consequently it is no longer possible for one group to be competent in all of these aspects, in terms of either expertise or hardware. Cooperative projects are therefore necessary if the capacity of specialized groups is to be utilised.

Developmental psychology

Nonverbal communication plays a central role in mother-infant interaction. Observable behavior during interaction is perhaps the main source of information about the ontogenesis of communication and social bonds. Both comparative studies of other species (Ploog, 1969) and those concerned with human mother-infant interaction (Papousek and Papousek, 1974) make useful contributions.

The previously mentioned study by Schoetzau and Papousek (1977) demonstrated how nonverbal variables of early mother-infant interaction can be measured under controlled conditions. The relation between communication in early childhood and learning processes in the social environment was examined by Grossmann (1977).

In a study based on ethological concepts, Stanjek (1978) observed children from the age of one year onwards. He examined their contact-making behavior in kindergarten and in a doctor's waiting room. He was particularly interested in the function of present-giving as a greeting action. He found that 1- to 2-year-olds often made contact in this way. Older children were found to include other strategies with which they also attempted to influence their status in the group.

It is advantageous that contributions to the research of developmental aspects in communication are being made by psychologists, physicians and ethologists, although this area could be mentioned only briefly here.

Applications

There are certainly many situations in which the findings on nonverbal communication are applied without the results being reported. In almost every case where video is used for observation, e.g., in the analysis of discussion groups and behavioral training, it may be assumed that visible behavior plays a major role. Frequently, it is not at all specified which behavioral content is of importance.

Aspects such as human territory, interpersonal distance and touching, which clearly play a role in social interaction, are given little mention in the German psychological literature. Although they are often explored, for example, in group therapy, and their importance is recognized amongst ethologists, the area has not yet been dealt with empirically by German psychologists.

Nonverbal communication has gained in considerable importance in clinical psychology and behavior-oriented psychiatry where it can be assumed that psychological disorders are accompanied – or manifested – by altered communicative behavior.

In a series of theoretical and empirical studies, Krause (1976, 1978, 1979, 1980, in press) has emphasized the major significance of nonverbal communicative behavior in relation to the widespread problem of stuttering. He considers stuttering to be an interaction disorder in which the display of affect is inhibited. In the empirical studies cited earlier he found that stutterers exhibited disorder in their behavior as listeners. In comparison to normal speakers they were found to exhibit less back-channel behavior and affect display. He also found that normal speakers exhibited more back-channel behavior with manifest stutterers than with latent stutterers.

Krause maintains that these results make a strong case for a change in therapeutic approaches to stuttering. He criticizes those therapies which aim at affect-free speech through training in rhythmic or monotone speaking. He maintains that these approaches fail in exactly those situations which are characterized by an increased expression of affect. Since stutterers have apparently inhibited affect behavior, he argues that a therapeutic program should include exercises in the expression of affect and speaking with affect. At the present time, studies in this direction are being carried out.

In psychiatry, the main reason for the systematic analysis of nonverbal behavior has been the need for objective clinical description. The proceedings on the Berlin symposium "Television in Psychiatry", edited by Helmchen and Renfordt (1978), contain a number of contributions dealing with this problem.

In recent years the study of pathological communicative behavior has been concentrated on cases of depression. A number of approaches are concerned with the rating of depressive states on the basis of visible behavior. In this fashion, Renfordt and Busch (1976) presented observers with three interview excerpts of 150 seconds' duration. The excerpts had been recorded from the beginning, middle and end of the patients' treatment, and were shown in random sequence. The observers were able accurately to rate the degree of depression. Different medication effects were also observable. In a second study (Renfordt and Busch, 1978), further differentiated behavioral features were rated. It was

found that for all excerpts the depressiveness rating correlated to some degree with the scoring of motor inhibition. According to the authors, both verbal and nonverbal features indicated a similar correlation.

In the rating studies of Ulrich, Harms and Fleischhauer (1976) and Harms and Ulrich (1978), agitation and inhibition were also differentiated. They found good rater agreement, including those cases where differentiated features were scored. Observer agreement was lower in those cases where in the improved condition the extent of the disorder was less extreme. Particular behavioral features are clearly related to the general rating of inhibition and agitation (Ulrich et al. 1976). Using factor analysis of the rating data Harms and Ulrich (1978) determined an inhibition factor which was described as reduced eye movement and facial expression, tense body posture and low voice. Two agitation factors were also found, one of which was related mainly to the general motor activity. The other is characterized by a close relationship to inhibition and may be described as continuous activity of the distal motor system.

Longitudinal studies of nonverbal behavior during depression by Ellgring and Clarke (1978) involved the rating and measurement of video-taped interviews. Relationships were found between the patients' subjective well-being and the relative frequency of gaze and speech. The nonverbal features examined were also found to show change earlier than other behavioral aspects.

The study and training of social skills in professions involving contact with the public were included in the civil servant project described earlier (Scherer, 1979; Scherer and Scherer, 1979). Suggestions were made relating to the improvement of the accuracy of perception of feelings and intentions of the interaction partner and of ability to manipulate conversation.

Some attempt has also been made to apply the results of research to pedagogy. Reinert and Thiele (1977) edited a collection of studies in this field. These range from score descriptions of dance patterns and detailed *Ausdruckspsychologie* interpretation of gestures, to extensive categorizations of behavior relevant to the classroom situation. It is difficult to establish whether these approaches are being pursued as intensively in pedagogy as they might be.

Summary

In clinical psychology, inferences concerning emotional state, motives, etc. are important. The value of classical *Ausdruckspsychologie* for diagnosis still remains to be demonstrated. The nonverbal communication approach appears to represent a viable alternative. However, the same errors which led to the fall from favor of *Ausdruckspsychologie* are also possible with this approach, namely extensive interpretation based solely on subjective experience.

If the results of research into nonverbal communication are to be applied appropriately there is little alternative to the learning of intensive observation procedures, the validation of observational data, and the development of new procedures. The segregation of observation and interpretation remains a critical and often ignored factor.

Observation and Analysis

The problems relating to the observation and analysis of behavior have always been critically debated. A few comments will have to suffice within the framework of this article.

An early overview by Weick (1968) was followed in the German literature by an extended article by v. Cranach and Frenz (1969). The particular problems associated with the human ethology approach to interaction are discussed by v. Cranach (1969). A further overview of observational methods has been contributed by Scherer (1974) in a handbook on techniques in empirical social research. The most recent contribution is the introduction to the methodology and praxis of systematic behavioral observation presented by Fassnacht (1979). Recently, a theoretical framework for the analysis of complex behavior has been proposed by Kalbermatten and v. Cranach (1980). Their model stresses the hierarchical construction of observational methods.

The problem of obtaining of valid observational data has been treated by Frey et al. (1979) in connection with their procedure for the measurement of motor activity.

Further procedures are presented by Clarke and Ellgring (1978) for the computer-aided handling of video recordings, and by Bente, Frick and Schuler (1978) for video-polygraphy. Simons and Papousek (1978) have described observation techniques and experimental procedures for research into infant behavior and mother-infant interaction. The volume edited by Mees and Selg (1977) on the observation and modification of behavior includes possible applications of various observational techniques in therapy and education.

Furthermore, descriptive models for sequences of behavior during interaction are still needed. A model involving the use of probabilistic grammar has been proposed by Clarke, Wagner and Ellgring (in press). This draws on the concepts of hierarchical organization and rule-governed behavior, and has been shown to reflect differences in the social situation and internal disposition of interactants.

Education, Research, and Trends

Nonverbal communication does not figure as a major subject in German university courses. Empirical research is, however, being carried out at a number of institutes, including the psychology departments at the Universities of Giessen, Saarbruecken, Berne, and Zuerich, and at the Max-Planck Institute for Psychiatry in Munich. In many universities, a advanced student may choose nonverbal communication as an optional subject. Courses in *Ausdruckspsychologie* are virtually nonexistent at German psychological institutes. Occasionally, the subject is mentioned in connection with nonverbal communication.

The present popularity of clinical psychology should lead to increased attention to nonverbal phenomena. For practical purposes, inferences concerning motivation and emotions are frequently dependent on the observation of behavior. In role-playing, for example, problems are both verbalised and expressed visibly. The question may be posed as to whether the global impression gained through direct observation is sufficient to permit the professional psychologist to interpret the individual's internal disposition and intention.

Greater effort must therefore be invested if the research findings on nonverbal communication are to be applied correctly. Although nonverbal phenomena are taken into consideration by the psychologist in such areas as therapeutic praxis, diagnosis and social skills training, no consistent academic corrective is evident.

The academic study of nonverbal communication will require that the methodological criteria of empirical psychology be fulfilled. This should not be under-

stood simply as a plea for a return to the laboratory. On the contrary, since it is known that communicative behavior is influenced considerably by the social partner and the social situation, more ways must be found of studying nonverbal communication outside the laboratory with various interactants and in a variety of relevant situations.

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