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Understanding Body Movement

A Guide to Empirical Research on Nonverbal Behaviour

With an Introduction to the NEUROGES Coding System

PL ACADEMIC RESEARCH

I. An Interdisciplinary Review on Movement Behaviour Research

1. Movement Behaviour Research through History and in Current Scientific Disciplines

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In the human culture, the pursuit of understanding body movement and its link to cognitive, emotional, and interactive processes can be reliably traced back to the ancient Greek. How body movement reflects and affects cognitive, emotional, and interactive processes is not only theoretically interesting but moreover, its knowledge has far-reaching practical applications such as for obtaining communicative competencies, for learning and teaching, and for diagnostics and therapy in different clinical contexts. Currently, the spreading of visual media in all cultures implies that not only the written or spoken word but moving human bodies substantially contribute to the transfer of information. Given this situation, it is becoming more and more important to build an empirically grounded knowledge of how body movement reflects and affects the individual's cognitive and emotional processes and how it promotes communication and regulates interaction.

Not surprisingly, in numerous academic disciplines the expressive and communicative potential of movement behaviour is a focus of interest, such as in psychology, health care science including medicine, linguistics, anthropology, sociology, human physical performance and recreation, media studies and communication, performing arts, cultural and ethnic studies, gender and sexuality studies, computer sciences, education, etc. In addition, many therapy forms such as dance movement therapy, body-oriented psychotherapy, or neurorehabilitation use body movement as therapeutic medium. However, as it will be exposed below, the interest in body movement and its link to cognitive, emotional, and interactive processes is not a recent phenomenon but has historically a long-standing tradition.

It is noteworthy that despite many research studies having been carried through, a common body of empirical knowledge about body movement and its link to cognitive, emotional, and interactive processes has not developed far. One reason for this is the scant scientific exchange between the currently prevailing academic disciplines and a lack of passing on knowledge from historically earlier epochs of research. Among others, differences in terminology and methodology are relevant obstacles for an interdisciplinary discourse on movement behaviour. Given this situation, this book starts with a short overview on research on expressive and communicative body movement across different sci-

entific disciplines, currently and historically. Note that for each field of research only a selection of references can be cited here.

Beforehand, the terminology used in this book shall be clarified. As a reflection of the scientific diaspora on research on body movement, different terms are applied in the field, such as nonverbal communication (e.g. Knapp & Hall, 1992), nonverbal behaviour, body language, kinesics (Birdwhistell, 1952), expressive movement (e.g. Allport & Vernon, 1933), or movement behaviour (Davis, 1972). While the terms nonverbal communication and nonverbal behaviour are the most popular ones, they have the disadvantage that they define a topic by negation ("not verbal"). The terms body language and kinesics focus on the interactive and communicative function of body movement. In contrast, the term expressive body movement underlines that body movement reflects an individual's mental processes. The term movement behaviour has been introduced by M. Davis (1972) for her interdisciplinary bibliography to refer to "the anthropology and psychology of physical body movement." Furthermore, it includes the aspect of behaviour: "Behavior or behaviour is the range of actions and mannerisms made by organisms, systems, or artificial entities in conjunction with their environment, which includes the other systems or organisms around as well as the physical environment. It is the response of the system or organism to various stimuli or inputs, whether internal or external, conscious or subconscious, overt or covert, and voluntary or involuntary." (Web Page Wikipedia, May 21, 2013). Davis' term is adopted in this book since it is comprehensive, neutral, and suitable for an interdisciplinary approach. It is used to refer to individual, cultural, and universal patterns of expressive, communicative, and practical body movements including the classical categories gesture, self-touch, action, shift, posture, and rest position.

A first testimony of the interest to relate movement behaviour to cognitive and emotional processes dates back to the ancient Greek philosophical school of Pythagoras. In that school, the application procedure comprised an evaluation of the applicant's gait and posture to assess his qualification (Jamblichus, cited by J. B. Porta, 1593, cited by Kietz, 1952). Later, during the Roman Empire, given the important role of political speech, knowledge on mime and the gestures of oratory was elaborated. During the Renaissance, the ancient knowledge on the relation between movement behaviour and personality was re-appreciated in the idea of the physiognomonics. The opus "De humania physiognomonia" by Porta (1593, cited by Kietz, 1952) documents this approach. For further literature on this period of time see e.g. Critchley, 1939, reprint 1970; Efron, 1941; Kietz, 1952; Kendon, 2004).

In 1872, Darwin published his seminal work "The Expression of the Emotions in Man and Animals" (1872, reprint 1955) in which he investigated the universality of emotional expression in facial and bodily movements. At the beginning of the last century, Darwin's thoughts and the ideas of the Renaissance had a

revival in the expression psychology (e.g. Klages, 1926; Allport & Vernon, 1933; Eisenberg, 1937; Eisenberg & Reichline, 1939; Buytendijk, 1956; Mason, 1957). Physiognomonics, facial expression, gesture, posture, gait, voice, and handwriting were interpreted as expression of affective states or personality (for a more detailed review see Asendorpf & Wallbott, 1982).

At that time, research activity also started to focus on movement behaviour in patients with mental disease and brain damage. In psychiatry, alterations of movement behaviour were reported in patients with depressive and schizophrenic disorders (e.g. Kahlbaum, 1874; Wernicke, 1900; Kleist, 1943; Kretschmer, 1921; Reiter, 1926; Leonhard, 1957). These alterations were classified into hypokinetic and hyperkinetic ones. In neurology, movement behaviour disturbances were analysed with regard to brain damage and brain disease, such as paralysis, ataxia, dystonia, etc. Of special interest for movement behaviour research are those deficits that are related to neuropsychological functions, notably apraxia, which affects practical action and gesture (e.g. Liepmann, 1907; Goldstein, 1908). In psychomotor research, methods of experimental psychology were applied (e.g. Oseretzky, 1931; Luria, 1965). Psychomotor tests, such as finger tapping, dexterity, or rhythm tasks, enable to register even fine motor deficits in patients with neurotic and psychotic disturbances (Wulfeck, 1941; King, 1954; Manschreck, 1985, 1989, 1990; Günther et al., 1991). In 1933, the psychiatrist and psychoanalyst Wilhelm Reich published his work "Charakteranalyse" in which he outlined the relation between an individual's character and body, specifically muscle tension patterns. Many of the current movement and body-oriented (psycho)therapies refer to his ideas. Dance movement therapy integrated knowledge from German expression dance and psychoanalysis (e.g. Kestenberg, 1965, 1967; Espenak, 1985; Schoop, 1981; Bartenieff, 1991). For the analysis of movement behaviour, dance movement therapists apply the Laban Movement Analysis, an elaborated descriptive dance notation (Laban, 1950, reprint 1988).

During the 1960's, reflecting the general trend toward social sciences, the focus of research shifted from the individual's expressive movement to the role of body movement in communciation and interaction and on its cultural differences (e.g. Efron, 1941; Hall, 1968; Birdwhistell, 1979; Ekman & Friesen, 1969; Davis, 1979, 1982; Kendon, 1990). Basically the same movement parameters as applied in expression psychology were then investigated with regard to their function in interactive processes: posture / position, gesture, touching behaviour / self-touch, facial expression, eye movement behaviour, personal space / territory, and vocal cues. Research on nonverbal interaction was also introduced to psychoanalysis and psychotherapy for the analysis of patient - therapist interaction (e.g. Mahl, 1968; Freedman, 1972; Krause & Luetolf, 1989). In psychosomatic medicine, with reference to the bio-psycho-social model, the patient's movement behaviour was considered as a symptom that reflects his/her psychosomatic state (e.g. Uexküll & Wesiack, 1986). A reduction of nonverbal emotional expression was found to be associated with psychosomatic disease and

alexithymia (e.g. Birbaumer, 1983; Birbaumer et al., 1986; Berry & Pennebaker, 1993; von Rad, 1983).

At the end of the last century, linguists have gained interest in gesture and sign language as nonverbal means of communication, reflecting cognitive processes (e.g. McNeill, 1985, 1987, 1992; Feyereisen, 1987; Müller, 1998; Kita & Özyürek, 2003). In line with psycholinguistic research on gesture and cognition, child psychologists study gesture to understand cognitive development (e.g. Goldin-Meadow et al., 1993). Moreover, recent evolutionary theories propose that language has evolved from manual gestures (e.g. Corballis, 2002). In the developing field of neuroscience, neuropsychologists investigate where in the brain gesture and sign language are produced (e.g. Kimura, 1973; Corina et al., 1992; Corina et al., 2003; Lausberg et al., 2007). Several studies examine gesture perception with functional neuroimaging (e.g. Gallagher & Frith, 2004; MacSweeney et al., 2004; Holle et al., 2008). Most recently, artificial intelligence researchers have started to develop gesture production models for embodied agents (Kopp & Bergmann, 2012).

This short historical review reveals that expressive and communicative movement behaviour has long been subject of scientific interest. Nowadays, its impact is reflected by the fact that movement behaviour is subject of investigation in many academic disciplines. The other side of the coin is that the diaspora of movement behaviour research across different disciplines is an obstacle for developing a common body of knowledge. This entails that movement behaviour research has not become an independent scientific discipline. Davis (1972, p. 2) makes an interesting observation regarding movement behaviour researchers: "The list of those who have written about expressive movement or nonverbal communication since 1872 reads like a "Who's Who" in the behavioural sciences; yet writers still defend the relevance of such study or introduce the subject as if it were esoteric or unheard of. It is as if a great many serious behavioural scientists have shown a fleeting interest in body movement and then gone on." Since Davis has reported this observation 40 years ago, obviously, not much has changed. Thus, not only the identity of movement behaviour research as an academic discipline but also the professional identity of the individual researcher who deals with movement behaviour seems to be fragile.

A thorough analysis of the complex question why this might be the case is beyond the scope of this chapter. It shall only be indicated that this might be related to the status of the body and thus, of body movement in the Christian-occidental culture that considers the body inferior to the mind. While the materialistic-functional aspect of body is accepted, such as the effort to achieve a perfect, functional, and good-looking body, the existential aspect of the body is neglected (e.g. Dürckheim, 1981). Furthermore, in our culture, research on the expressive aspects of movement behaviour is often regarded with ambivalence. This is due to the fact that movement behaviour is often displayed implicitly, i.e., beyond the mover's awareness. This leads to the concern that the analysis of

one's body movement might uncover aspects of one's personality or feelings that one might not want to uncover. This attitude explains, for example, why only few psychotherapists agree to have their movement behaviour analysed during psychotherapy sessions. The low esteem of the body and its movement becomes manifest in several domains of our culture. As an example, there is a scant regard for art forms that use body movement as a medium such as dance, while "non-body" art forms such as music or literature are more appreciated. Furthermore, despite the fact that they have an equally long tradition and are equally appreciated as effective by patients (Olbrich, 2004), movement and body-oriented (psycho)therapies are less accepted in the health care system than verbal psychoanalytic and psychotherapeutic therapies (e.g. Bühler, 1981). (Of course, this is also caused by a lack of empirical research which could demonstrate the effectivity of movement and body-oriented therapies). Likewise, for a long period of time, sign language has not been accepted by the society as a valid means of communication for the deaf community. Fortunately, possibly also promoted by the rise of research on sign language, the status of sign language in society has recently improved. The cultural attitude might explain why, thus far, despite the long tradition and the broad scientific interest research, movement behaviour has not developed as an academic discipline on its own.

The lack of a scientific identity entails that in the course of history movement behaviour research has always been substantially coined by the dominant scientific discipline. This situation renders it difficult to follow the central thread of movement behaviour research through history. As a consequence, references to historically earlier but nevertheless relevant research are rarely made, and in each historical scientific era, expressive and communicative movement behaviour seems to be discovered de novo. The lack of scientific identity of the research field is not only a longitudinal historical problem but also a horizontal interdisciplinary one. Nowadays, as exposed above, research on movement behaviour is spread over many different academic disciplines. While the common denominator of these different scientific approaches is that movement behaviour reflects and affects cognitive, emotional, and interactive processes, there is hardly an interdisciplinary exchange. This lack is a severe obstacle for scientific progress in movement behaviour research. Movement behaviour researchers are often simply not aware of the substantial body of research that has been done in other fields so far, historically and concurrently. Therefore, some researchers have been dedicated to making knowledge from other historical epochs and other academic disciplines available to their colleagues (e.g. Davis, 1972; Davis and Skupien, 1982; Asendorpf & Wallbott, 1982; Wallbott, 1982; Kendon, 2004). Hopefully, in the same vein, this book will contribute to promote interdisciplinary understanding and exchange, among others by demonstrating the effects of different methods on research findings.

However, while there are many obstacles in developing movement behaviour research as a discipline on its own and on building a common body of knowledge, the currently increasing distribution of visual media is a cultural develop-

ment that is clearly in favour for promoting movement behaviour research. Through TV, internet, and video games, users are nowadays constantly confronted with moving human and avatar bodies. In contrast, in the first half of the last century, acoustic information transfer through radio and telephone was predominant. The current omnipresence of moving human and avatar bodies calls even more for a thorough basic knowledge and understanding of how movement behaviour – on the conscious and unconscious levels - reflects and affects cognitive, emotional, and interactive processes.

Finally, as stated above, another reason for the scant exchange of knowledge between the academic disciplines is differences in terminology and methodology. These differences make a comparison of the findings of different academic discipline difficult and inhibit that a common interdisciplinary corpus of knowledge grows. In fact, this problem is not only an interdisciplinary one but also an **intra**disciplinary one, as often within one discipline, researchers invent their own movement analysis systems. The results of their studies are then difficult to integrate in a common body of knowledge.

Furthermore, as it will be outlined in Chapter 3, the field of movement behaviour research suffers from a lack of effective and efficient methods. Until the 1960s, movement behaviour as a transitory phenomenon was difficult to register and to submit to research. This is illustrated by Efron 's "fourfold method" (1941, p. 66), in which he applied several techniques commonly used at his time: "(1) direct observation of gestural behaviour in natural situations, (2) sketches drawn from life by the American painter ... under the same conditions, (3) rough counting, (4) motion pictures studied by (a) observations and judgments of naive observers, and (b) graphs and charts, together with measurements and tabulations of the same." Thus, the painstaking analysis of movement behaviour might also explain Davis' observation that single researchers do not stay in the field.

However, also with regard to this aspect, the current situation characterized by an impressive technical progress is in favour for developing the scientific field of movement behaviour research. The registration of movement behaviour has become simple and qualitatively improved by using digital video. Furthermore, the availability of software for the annotation of videotaped movement behaviour substantially facilitates the analysis of movement behaviour data (see part III in this book). However, the technical progress will only entail scientific progress, if movement behaviour researchers identify entities of body movement behaviour that are relevant with regard to cognitive, emotional, and interactive processes.