Intentionality as a Basis for the Emergence of Intersubjectivity in Infancy

BY

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Abstract


Intersubjectivity requires two subjects who perceive each other and treat each other as subjects. To be a subject implies to act willfully and not be reduced to automatic reactions to outer events or physiological states; that is, to be a subject implies intentionality. It is a common view that infants younger than six months are not subjects in this sense, although they are treated as such by their parents. Thus, there can be no intersubjectivity between parent and infant at such an early age. However, there are descriptions of early parent-infant interaction that include references to the infant's intentionality. Rudimentary forms of intentionality have been reported in infants as young as two months of age. Accordingly, the relation between parent and infant is described in terms of intersubjectivity.

In order to examine these contrasting views the definition of "intentionality" is discussed. The present thesis rejects the conception that intentionality is the same thing as goal directedness, a conception embraced by almost all infant researchers. Instead, a definition in terms of behavioral object directedness is proposed as suitable for studying the development of infant intentionality. While anchored in the philosophical concept of intentionality, this definition extends intentionality from being a property of the mind to also being a property of behavior. It lays the foundation for exploring a new method of observation. This method implies that intentionality is graded and not an all or none issue. The method is, thereby, sensitive to rudimentary forms of intentionality.

Application of the method on video recorded parent-infant interaction shows that the parent tends to attribute more intentions to high levels of infant intentionality than to low levels, and that this occurs when the baby is as young as two to three months old. That the parent treats the baby as a subject thus seems to be based on the parent perceiving the baby's behavior as intentional. This justifies that the relationship between infant and parent can be characterized as intersubjective at two to three months of age.

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For
Jean-François Lyotard
This thesis is based on the following papers, which will be referred to in the text by their Roman numerals:


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Contents

PREFACE....................................................... vi
THE PHILOSOPHICAL PROBLEM OF SOLIPSISM.............................. 1
THE PSYCHOLOGICAL PROBLEM OF INTERSUBJECTIVITY................... 4
THE CONCEPT OF INTENTIONALITY ....................................... 9
   The Problem of Infant Intentionality
      (Summary of Study I)........................................... 9
Intentionality and Representations
      (Summary of Study II)......................................... 10
Infants and Refrigerators.................................................. 12
THE OBSERVATION OF INFANT INTENTIONALITY
      (Summary of Study III)........................................ 21
Method .......................................................... 21
Results .......................................................... 22
   Evaluation of the method......................................... 22
   Organization of the data....................................... 23
   The development of infant intentionality .................... 23
   Social and physical orientation.............................. 24
   The relationship between infant intentionality
      and the parent's attribution of intentions to the infant .... 24
Summary Conclusions from the Empirical Study....................... 25
GENERAL CONCLUSION: INTENTIONALITY AS A PREREQUISITE
   FOR THE EMERGENCE OF INTERSUBJECTIVITY..................... 26
REFERENCES..................................................... 30
Preface

The first year of life is a period that deeply fascinates parents and psychologists alike. The Latin word *infans* means "who is not yet endowed with speech". However, parents feel that even a very young infant is a person, a social being, not only something to be handled with great care but with whom one can also communicate. Psychologists, on the other hand, saw the human baby as incomplete. The difference between human infants and other animals was that the former was more of a *tabula rasa*, lacking adaptive behavior at birth, but was compensated by a capacity for learning unrivalled among other species. This view of the infant has changed during the last 25 years. Due to new research approaches, the infant has revealed itself as a very competent creature. The social competence of the infant has especially been of much interest, and in Sweden I am not the first (nor surely the last) to present a doctoral thesis in this field. Among my predecessors I would like to mention Brumark (1989), Heimann, (1988, although this thesis was submitted in the United States) Janson (1975), Kugiumutzakis (1985), and Preisler, (1983), each one with his or her particular approach and particular values making them sources of inspiration for me. It is striking that all, except Janson, have been inspired by the work of Colwyn Trevarthen, in Edinburgh, whose perspicuous and enthusiastic descriptions of mother-infant interaction have inspired also me to go on with a line of research that had, from the beginning, quite a different origin. On the other hand, I share with Janson this origin, namely the phenomenological movement in philosophy. I see my own contribution as an attempt to make the connection between phenomenology and Trevarthen's description of mother-infant interaction in terms of intentionality and intersubjectivity.

To whom do I owe this thesis? Like any written work, it is a modern offshoot of Greek tragedy and, by that, it is an expiatory sacrifice. It is thus already owed as a debt to an insatiable creditor that cannot be named. It is vain to believe that one could efface this debt by offering thanks. Instead I would like to express my gratitude toward a number of people — closer to me — from whom I have received help, support, advice, and encouragement to the extent that makes that unnameable creditor inconsiderable.

First I wish to thank my thesis advisors, Berndt Brehmer, Bo Johansson, and Sverker Runeson. In reading drafts of my papers, Berndt was always able to find the crucial issues that needed more work. He held at my disposal his seemingly inexhaustible reserves of knowledge in all domains, from statistics to philosophy. It was a pleasure to come to him and feel that I was understood right away. That comfort might have given me a false sense of security, if it were not balanced by Bo's insistent demands for more clarity in my thought and his repeated questioning of my basic premises. While demanding in academic rigor, Bo was generous in providing support on practical matters. Decisive practical support was also provided by Sverker.
More importantly, however, was the opportunity to discuss directly with the scientist (i.e., Sverker) who stated the KSD-principle. This principle turned out to have an important impact on the development of my notion of intentionality. The ecological approach to perception and action demands a new way of thinking, not easy to adopt, and Sverker has been very patient in training me and in pointing out pitfalls in my thinking.

Another group of persons, Alan Costall, Lennart Melin, and Jaan Valsiner, has been so generous with their time that I dare consider them as informal advisors. Each one contributed in a way that was decisive for the completion of this thesis.

Alan Costall has provided invaluable help in the writing of the three papers included in this thesis as well as the present summary. He was superb in examining the coherence of my thought and tireless in discussing the problems with my theoretical thinking and method of observation. During several exciting meetings he shared with me his vast knowledge and his acute sense of English style. Thanks to Alan, it was possible for me to make substantial improvements to all three papers. I am infinitely grateful!

I have greatly appreciated the interest Lennart Melin has taken in my work, and I am grateful for the time he has given me. Backed up by a profound understanding of my theoretical standpoints, Lennart has successfully applied the maieutic technique on me, inspiring me to find, by myself, the most appropriate solutions to the problems I had in handling the overwhelming amount of data I had gathered.

With Jaan Valsiner I discussed extensively the whole project on the development of infant intentionality. Patiently he helped me to see the crucial issues in the flow of unorganized ideas pouring out of my head and helped me to see clearly a suitable empirical approach. He gave me a sense of encouragement when he invited me to participate in the symposium on "Children and Environment: Creating Structures in Interaction", at a congress in Munich in 1983.

Berit Hagekull, Lars Åberg, Jan Kylenstierna, and Dag Sörbom have given me advice and support on matters of method, observation, and reliability for which I am very grateful. I am also grateful to John Kugiumutzakis for an interesting and clarifying discussion on Study I and to Gunilla Stenberg, who has provided valuable comments on study III.

Ingrid Lagerlöf has provided great insight and perspicacity in her comments to the summary of this thesis. The discussions with Ingrid remind me that this thesis should not be considered as a finished product. In addition, her own background in working on expressive movements in dance enables her to give me new ideas on how to pursue the line of thought and research presented below.

This thesis is a result of a project started jointly by Eiwor Westin-Bucht and me. I owe a special dept to Eiwor, who did not have the opportunity to take advantage of the work we did together in the first outlines of a theoretical approach and in the video recordings. We spent much time together collecting the video recordings and in inspiring discussions. I appreciated her frank approach and genuine interest in our common project.
In my first attempts toward a method of observation Arne Edh, Ulla Folkesson, Birgitta Jensen, and Lars-Gunnar Lundh participated. Thanks to all of them for their contributions. Thanks also to Birgitta and Urban Sandén for helping me check reliability.

Anybody would envy the facilities I have had at my disposal and the kindness with which I have been met, when it comes to technical and administrative support. I have had the best that is available. Cordial thanks to Lars-Göran Andersson and his colleagues at the audio-visual center of the university; to Karl-Erik Grydén, Lars-Erik Larsson, and Raymond Ränge at the technical unity; to Gunilla Hellerstedt, Christina Reid, and Siv Vedung at the department's library; and to Inga Cederberg, Peter Hammarlund, Mildred Lubandi, Anne-Louise Sabel, and Elsa Sjöberg at the department's administration. A special thanks to Gunnar Ågren, who managed to secure the video recordings in danger of deterioration due to defecting tapes. Through his firm negotiation with the Sony representative in Sweden, I also got access to a modern video equipment (see Study III), which finally made possible the analyses of the video recordings.

Bill Dockens, Emily Holmes, and Les Shaps have kindly reviewed my texts for English. In this respect, comments from Berndt Brehmer and Sverker Runeson have also been valuable. Most importantly, however, Alan Costall’s insistent and rigorous work with my English style has been an indispensable factor over the years of which I am most grateful.

Thanks to Margareta Sanner for persistent encouragement and for giving valuable discussions on many issues, especially on the summary. I appreciate her views, taking the position of an “enlightened public“, forcing me to express myself in a way that can (hopefully) be more generally understood. Thanks also to my son, Christian, for giving me the opportunity to be a parent myself and for experiencing the wonders of parent-infant interaction.

Finally, I wish to express my gratitude to the seven parents and infants who participated in the study. The reader may wonder why only six dyads are mentioned in Study III. During the recordings with the first dyad Eiwor and I were working out the theoretical approach and also getting acquainted with the technique of video recordings. The first dyad was, therefore, not included in the study.

A long time ago, Jean-François Lyotard, the French philosopher, proposed that I should write a paper on the constitution of intersubjectivity from intentionality in the philosophy of Edmund Husserl. I did so (Vedeler, 1968) as partial fulfilment of the requirements for a Maîtrise ès Lettres at the University of Paris, under the skillful guidance of Emmanuel Levinas, who once was Husserl’s student. This proposal from Jean-François started a long line of interest and research that has resulted in the present thesis, and which, I hope, will continue. It was his last act of good will during the two years I had the privilege to be his student. I dedicate this thesis to him, in admiration for preeminent teaching, in gratitude for taking care of me when I was a student in Paris, and in deep friendship.
The Philosophical Problem of Solipsism

Descartes (1641/1966), searching for a sure foundation of all knowledge, found himself in doubt of everything and looked for one single piece of knowledge, at least, of which he could be certain. He found it in the fact that in order to have doubts, there must be someone having these doubts. Being uncertain of the existence of everything else and of the truthfulness of all his knowledge, he found it impossible to doubt that he doubted. Therefore he proposed the famous statement Cogito, ergo sum as a irreducible foundation of all knowledge. As I am thinking (doubting), I must be sure that I, as a thinking being, exist. However, this foundation was of no help in being certain of anything else. It did not make the existence of the world, or of other people, more certain than before. It did not even assure the existence of a material body in which the thinking being is harbored. The ego had to be conceived as pure mind. The ego’s experiences of a body, of the world, and of other egos, could as well be a dream with no foundation in reality. Descartes’ Cogito, had to face the problem of the solus ipse, the ego lonely within the mind. The ego, as a thinking being, is isolated in a world consisting only of experiences, without certain knowledge anything, for sure, of an outer reality corresponding to these experiences. They might as well be an extremely elaborated and consistent dream, or the work of a malign spirit.

Descartes’ solution to this problem was a search for another thought, that was absolutely indubitable. What he found was the idea of God. This idea was so clear, so compelling, and so perfect, that Descartes could not doubt it. Thus God became the guarantor of the truthfulness of one’s experiences of the world and of other people. Many subsequent philosophers found themselves unsatisfied with Descartes solution, and the problem of solipsism has since then haunted philosophy. An ensuing problem was how the relationship between body and mind should be explained, an issue to which I will return.

Husserl (e.g., 1913/1931), looking for a foundation of knowledge in our experiences of the world, ended up with a phenomenological idealism and an unsolved problem of the truthfulness of our experiences, a position close to that of the empiricist philosopher Berkeley (1710/1965). In contrast to Berkeley, however, Husserl insisted that the ego was more than a “mind” where the experiences took place, it was the subject of these experiences, it was endowed with intentionality. This position did not break the loneliness of the ego; the intentionality of the mind did not get the ego in touch with the world. The experiences were admittedly constituted by the subject. The world and other egos thus could be no more than a projection of the solus ipse, a position as unacceptable to Husserl as to anyone else.

Husserl made only one serious attempt to solve this problem. The solution was presented in a small book that was meant to be a sequel to Descartes famous Metaphysical Meditations, entitled Cartesian Meditations (Husserl, 1950). In the last chapter of this book Husserl tried to show how the ego, as a subject, constitutes other egos as equal partners in a community of intersubjectivity. This community, in turn, is the foundation of the objective world, although “objective” in this case meaning no more than “intersubjective”, a position commonly adopted, in philosophy as well as
among scientists taking a position on ontology. I want to stress the logic of
the argument. Only when the ego is sure about the existence of other sub-
jects, other egos, with whom the experiences can be shared, can it be sure
about the truthfulness of its own experiences. The core problem is, thus,
how can we be sure of the existence of other egos? I have elsewhere
(Vedeler, 1968) scrutinized Husserl’s attempted solution. Here it suffices to
say that the main concept he used was empathy, through which the ego
could recognize himself as a subject in the body of another human being. I
put myself in your place, as it were.

No more than anyone else (for an exception, see Andrew, 1982) was
Husserl satisfied with the solution to the problem of intersubjectivity pre-
sent in the Cartesian Meditations. The book was never published in
German during his lifetime; only a French translation appeared (Husserl,
1931). In other manuscripts, left unpublished during his lifetime, he also
relaxed the radicalism of his initial Cartesian position, assuming the exis-
tence of other egos prior to their constitution by the own ego (Spiegelberg,

A French philosopher, Maurice Merleau-Ponty, studied Husserl’s unpub-
lished later manuscripts in the Husserl Archives at the University of
Louvain. These studies led to a fresh approach, taking the problem of inter-
subjectivity out of the cul-de-sac to which Husserl’s Cartesian solution to
the problem had led. According to Merleau-Ponty (1964, p. 240), Husserl
seems to have gone so far as to reverse the relation between intentionality
of the ego and intersubjectivity: The ego, in its subjectivity, is first consti-
tuted through being in touch with other egos. However, taking this position
implies a tacit postulate that other egos exist, and so Husserl had thereby im-
plicitly accepted that his radical Cartesian position has failed.

The philosophical problem of solipsism is formidable indeed, and every
philosopher, or scientific researcher careful enough to take a stance on
ontology, needs to face the problem and admit an ontological postulate to
solve it, commonly an assumption that the material world exists. There are
some exceptions to this stance, among them Fodor (1980) who openly recog-
nizes “methodological solipsism” as a legitimate position for the study of
the human mind. A fundamental assumption underlying the problem,
however, is that the mind is distinct from a body in which the mind is
harbored. (A behaviorist position, thus, denying the reality of mind, does
not have to face this problem.)

Merleau-Ponty (1945/1962, pp. 369ff) himself approaches Descartes’ cogito
by pointing out that Descartes did not solve the problem of what unifies all
the thoughts of the ego. Merleau-Ponty sees two contradictory and impos-
sible consequences of Descartes’ approach. Either the ego is God, or there is
ultimately no unifying ego — what is left is nothing but a bundle of uncon-
nected thoughts. Merleau-Ponty considers the solution of this problem to
be found in perception. If I cannot be certain that my percepts are truthful, I
can neither be certain that I have the percept as a simple thought. When
Descartes says that one cannot be sure about what one sees neither is it pos-
sible to be sure that one has vision. And one cannot think of a thing one
has not seen, heard, felt, etc. Thus there is nothing to doubt, the cogito is
empty. The ego cannot think, because it has nothing to think of.
The fact that we indeed have perception is in itself the proof of the existence of the world, as well as of the perceiver’s own body. Merleau-Ponty advocates the “primacy” of perception: it is the foundation of all knowledge and needs to be taken into consideration before every other level of knowledge. Every perception of an outer object is also the perception of our own body related to the outer object. It is the meeting between the outer object and our own body, a meeting *situated* in a specific environment and at a specific moment. The truthfulness of our perception can only be assured by our commitment to the specific situation in which it takes place. The *cogito* cannot be an act of the mind, isolated from the world. It is only possible *in* the world.

Intersubjectivity should thus not be necessary for assuring the truthfulness of our thoughts, or of our perception of the world. But how can we be sure about the existence of other *egos*? The point of view of Merleau-Ponty (1945/1962, p. 346ff) is a rather complicated matter to explain, and it is not at all evident that he has solved the problem. For my purpose here it is enough to mention the following points put forth by Merleau-Ponty: I perceive myself perceiving the outer world. In the world I also perceive other people equally perceiving the outer world, that is, I perceive the other subject as *behavior*. And that implies in turn that the world itself is invested by another dimension, from the very start. It is not only what is seen by me, it is also what is seen by other *egos*. The world is from the beginning *intersubjective*. From this position Merleau-Ponty takes an even more radical step. Descartes’ *solus ipse* is *not* an inevitable primary position from which the *ego* needs to get in touch with other *egos*. On the contrary, the idea of solipsism itself presupposes other minds. I cannot have the idea of being alone in the world, if I do not have the idea of other *egos* from which I am isolated. From where do I have the idea of other *egos*? The answer is: from perceiving other people perceiving the world, as I do. The primary fact is that the *ego*, as a body, is *situated* in a world of people, in a world of *behavior*. The ideas of *ego* and *alter ego* are dependent on the perception of myself and the other as perceiving beings.

Merleau-Ponty does not spell out that he talks about perception as behavior. This follows, however, from his approach in general, from his discussion of behavior in his first book (Merleau-Ponty, 1942/1963), and from his view on the importance of the body (Merleau-Ponty, 1945/1962). In fact, not only does he consider perception as behavior, but he also extends the perceptual view to all behavior. I will return to this point later, as it becomes important for what follows.

Instead of trying to prove the existence of other *egos* from the radical position of solipsism, Merleau-Ponty thus turns the problem the other way round. How can we understand that we are *egos* and *alter egos* at all? His answer is: The *ego* cannot experience him- or herself as such without also having the experience of *alter egos*. *Intersubjectivity is a necessary prerequisite for the experience of self.*

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1 For an succinct account of Merleau-Ponty’s position on the existence of other *egos*, see Lapointe (1976).
The Psychological Problem of Intersubjectivity

The position of Merleau-Ponty on the issue of solipsism and intersubjectivity invites a psychological treatment. Piaget (1937/1954) stated the principles of egocentrism, that there is a painstaking development for the child to achieve the recognition of other minds. Through distinguishing itself from the world, the infant reaches the notion of self. From that the child needs to take a step further to recognize that there are also other points of view, that is, other selves. Other scholars in developmental psychology have claimed that the child recognizes self and others at a much earlier age, although without questioning the order of their appearance as set by Piaget. Stern (1985, p. 124) states that “only when the infant can sense that others distinct from themselves can hold or entertain a mental state that is similar to one they sense themselves to be holding is the sharing of subjective experiences or intersubjectivity possible”. This, he suggests, begins to emerge around seven to nine months.

Piaget’s and Stern’s position (as well as the position of most students of psychology, except the pure behaviorists) reflects the impact of the Cartesian dualism of body and mind that is at the origin of the problem of solipsism. From a developmental perspective, the ego needs to find his or her own mind before recognizing the minds of others. There is more to this position, though. Other minds have to be inferred from the behavior of other humans (and possibly animals). Only when the baby is capable of making this inference is he or she capable of recognizing the existence of other egos. That posits the psychological problem of solipsism in a nutshell; only purely logical inferences are absolutely certain. The correctness of empirical inferences (e.g., of other minds) can only be estimated in terms of probabilities (Brunswik, 1950).

The ecological tradition of Gibson offers a parallel in psychology to Merleau-Ponty’s approach in philosophy2. For Gibson (1966, 1979) perception is, by definition, direct and truthful. It consists of picking up information from the environment and implies no inference. Johansson (1973) has shown that human behavior can instantly (i.e., within a fraction of a second) be seen as such, also when the visual information is reduced to a film recording of a person acting in a completely dark room with lights attached to the joints. Further, Runeson and Frykholm (1983) have shown that human emotions and intention to deceive can equally be directly perceived under the same stimulus conditions to those used by Johansson.

The conceptual framework of Gibson and the empirical findings of Johansson and Runeson furnish necessary complements to Merleau-Ponty’s position that the ego perceives other egos as behavior. Perceiving the other as behavior does not imply that there is a mind concealed behind the behavior. The objection could be raised, however, that the link between ego and behavior still assumes some kind of inference, although that was certainly not what Merleau-Ponty meant. Runeson has provided empirical support for the position that other people are directly perceived as mindful beings.

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2 For a comparison of Merleau-Ponty and Gibson, see e.g., Glotzbach & Heft (1982), Heft (1989), or Sanders (1991).
His experimental set-up leaves little room for inferential procedures.

The position of Stern, quoted above, means that the infant needs to recognize the other ego as a mindful being in order to establish intersubjectivity. In support for this position, Stern cites Trevarthen and Hubley (1978). However, Trevarthen considers intersubjectivity to be an innate mechanism. The developmental achievement described by Stern is called secondary intersubjectivity by Trevarthen, and it is not dependent upon the emergence of a sense of ego, as maintained by Stern. It is preceded by a primary intersubjectivity, developing between two and three months. While secondary intersubjectivity implies the sharing, between the infant and the caregiver, of experiences of events and things in the world, primary intersubjectivity is restricted to the sharing of emotions. In secondary intersubjectivity, infant and caretaker can communicate about the world, while in primary intersubjectivity, they communicate about their own emotions.

Trevarthen does not explicitly say that the infant is born with a sense of self, with an ego. On the contrary, some passages indicate that he conceives the relationship between intersubjectivity and sense of self in a way that approaches him to Merleau-Ponty, namely that the former precedes the latter, e.g., “the mechanisms of intersubjectivity serves both self-organization and cooperation with others” (Trevarthen, 1989). To prevent misunderstanding, it should be noted that Trevarthen gives a specific meaning to the term “subjectivity”, distinct from the sense in which Stern use the same word. Trevarthen (1980, p. 326) defines subjectivity as “motives to know the physical world”, while intersubjectivity implies “motives to communicate with other persons” (see also Trevarthen, 1979a, p. 322). As such both are innate. But the development of intersubjectivity precedes the development of subjectivity, in ontogenetic time, and it is only when the two kinds of motives are combined in secondary intersubjectivity that what Stern calls “true” intersubjectivity emerges (Stern, 1985, p. 134). Thus, while Trevarthen's position does not necessarily imply that intersubjectivity is a prerequisite for subjectivity, in its more commonly received meaning of having a sense of self, neither does he hold the position, as does Stern, that an elaborate sense of self is a prerequisite for intersubjectivity. On the other hand, the quote from Trevarthen (1989) above suggests that intersubjectivity might promote the emergence of a sense of self.

The position of Trevarthen is rather unique in developmental psychology (see also Tronick, Als, & Adamson, 1979). It has also been attacked from several quarters. I have already mentioned Stern (1985). Kaye (1982, p. 142ff) more precisely criticizes Trevarthen’s position that the infant is communicating its emotions to the caretaker. Kaye (1982, p. 141) distinguishes three different meanings of the sentence “Expression X shows that person A feels Q” :

| Sense 1 | A has the emotion Q. |
| Sense 2 | From A’s behavior X an observer infers that A has the emotion Q. |
| Sense 3 | The person A wants the observer to believe that he or she has the emotion Q. |

The issue for Kaye is the difference between Sense 2 and Sense 3. Sense 3 adds an intersubjective dimension to sense 2. Sense 2 is an asymmetrical
It is not implied that in expressing the emotion, the person A intended to trigger the interpretation made by the observer. Only when A is able to assume (correctly) that expression X means the same to the observer as to him- or herself, that is, only when there is intersubjectivity between A and the observer, is Sense 3 possible. Kaye also expresses this relationship in terms of A and the observer sharing the meaning of X, or more generally, sharing the experiences related to their expressions. There needs to be reciprocity in the use of expressions of emotions, as well as in the use of other behaviors, that by this reciprocity can function as gestures.

This reciprocity requires two capacities of the infant; first, to have an intention to make the parent understand that he or she has the feeling Q and conveying that intention by expressing X; second, to be able to perceive the intention of the parent, when the parent expresses behavior X, to convey the same feeling, as when expressed by him- or herself. The question then is: How can these capacities be observed?

Stern (1985, p. 128) mentions three “mental states” that do not require language, but still indicate shared experiences. The first is “sharing the focus of attention”. At about nine months the baby can both follow the line of direction of a parent’s pointing and point out an object to the parent. Thus there are clear behavioral criteria of sharing focus of attention.

Stern’s second mental state, that also appears at about nine months, is “sharing intentions”. It comes close to Kaye’s Sense 3 cited above. As to behavioral criteria Stern cites Bates (1979, p. 36), who mentions “(a) alternations in eye gaze contact between goal and the intended listener, (b) augmentations, additions, and substitutions of signals until the goal has been obtained, and (c) changes in the form of the signal towards abbreviated and/or exaggerated patterns that are appropriate only for achieving a communicative goal”. (a), again, is a reference to the focus of attention, and as such a clear cut behavioral criterion. (b) and (c), however, make reference to the goal, not as a perceivable object in the environment, but as a future state of affairs that the infant presumably wants to reach. Such “behavioral evidence” thus makes reference to the kind of mental states that it is supposed to be criteria of.

The third mental state is “sharing affective states”, which Stern (p. 138) considers “the most pervasive and clinically germane feature of intersubjective relatedness”. It consists of three steps (p. 139): (1) The parent read the infant’s feeling states through the infant’s behavior (e.g., the infant joyfully bangs a toy with the hand). (2) The parent shows the same feeling, although in a different behavioral mode (e.g., by falling into the rhythm vocalizing kaaaa-bam). (3) The infant recognizes the behavior of the parent as corresponding to his or her feeling (of joy).

This also comes close to Kaye’s Sense 3 above; rather it could be considered as a prerequisite, as it lacks intentionality. Unfortunately Stern does not tell much about the behavioral criteria of step 3; how do we know that the infant recognizes the behavior of the parent as corresponding to his or her feelings? The criteria of sharing affective states are to be found in the behavior and comments of the parent, rather than in the behavior of the infant. Anyhow, this capacity is supposed to appear at 9 months.
To summarize: Kaye and Stern defines intersubjectivity in terms of a capacity to understand an inner state of another person, as opposed to only react to the other person's behavior. Stern, in addition, assumes intersubjectivity to be dependent on the child's core sense of self. Both authors seem to agree that intersubjectivity is related to the following features:

1. Orientation of behavior and attention toward each other, and perception of each other's focus of attention.
2. Knowledge of each other's feelings.
3. Knowledge of each other's intentions

(2) and (3) assume inner mental or emotional states, to which perceivable behavior is linked.

Let us compare this to Trevarthen's concept of intersubjectivity. How come that Trevarthen ascribes intersubjectivity to infants much younger than 9 months, and that he even considers it to be innate (Trevarthen, in press-a)? He anchors his theory to the concept of motive, defined as "a mental function that is a cause and director of movement and, at the same time, a seeker of information to direct and confirm movement" (Trevarthen, in press-a). What he seems to mean is something like an intention, although without any clear idea of the goal or of the means to reach the goal. The important point is that he considers some motives to be innate, notably motives to communicate, that take a behavioral form at two to three months. The behavioral evidence for such motives, however, does not go beyond the two behavioral criteria already mentioned, that is, on the one hand behavioral orientation and on the other expression and perception of emotions.

The examples given by Trevarthen, (1980, p. 326f) of motives to communicate with persons (= primary intersubjectivity, e.g., motives "to seek proximity and face-to-face confrontation with persons") could as well be described in terms of needs, if they are not simply reaction patterns, such as expressing confusion or distress in front of an incomprehensible or threatening partner.

Secondary intersubjectivity is recognized by both Stern (1985, p. 134) and Kaye (1982, p. 146) as equivalent to what they call intersubjectivity. However, as Kaye writes: "Its "primary" precursors are all in the parent's interpretation" and Stern: "Only Trevarthen's secondary stage is true intersubjectivity." What is the core of this difference in view?

Stern requires a symbolic function for intersubjectivity to be present. The child recognizes the parent's gestures as such. Kaye requires that the feeling is expressed intentionally, though not necessarily mediated by a gesture, and that the emotional expression means the same to the parent and the child. Common to both authors is a requirement that a behavior is linked to an inner (mental) state and that both parent and child link the same behavioral form to the same inner state. What is the behavioral evidence that this is the case? Stern (1985, p. 140) openly admits that there are no certain criteria and refers to the intuition of the parent. The closest Kaye comes to a criterion of shared meaning, and thus of intersubjectivity, is evidence that the infant anticipates the effect of his or her behavior on the adult.

Faithful to the Cartesian tradition of separating body and mind, both Stern and Kaye assume that the link between behavioral form and inner
state is problematic. How can the mother know that the baby is joyful when he or she smiles; how can the baby know that the mother is joyful when she smiles? It is not self-evident that a smile means joy for both. Trevarthen (Trevarthen, in press-b), contrary to Stern and Kaye, takes the position that emotions can be directly perceived; they need not be inferred from behavior. This position is supported by Zajonc (1980), who proposes that emotional reactions, accompanied by a minimum of cognitive processing, are much faster than cognitive reactions and therefore cannot be supposed to depend on elaborate cognitive processing, that is, the received view that emotion is dependent upon cognition is wrong. Furthermore, in accordance with the findings of Johansson (1973) and Runeson and Frykholm (1983), quoted above, Dimberg (1988, 1992) has found evidence of preconscious responses to facial stimuli with angry or joyful emotional expressions. He concludes that emotional reactions are automatically elicited, independently of cognitive activities. When the baby sees the mother smile, the baby also directly perceives the mother’s joy, and vice versa. In view of the above evidence, thus, the knowledge of another person’s feelings, as a feature of intersubjectivity, poses no problem.

What about knowledge of the other person’s intentions? Here Trevarthen has shifted, from referring to the infant’s intentions in the papers published in the seventies to referring to infant “motives” in the papers published since then. Motives, as well as emotions, can be directly perceived (Trevarthen, in press-a). However, as far as I can understand, and as already mentioned, displaying and perceiving motives does not go beyond the expression and perception of emotions. The alleged reasons for not referring to intentions is that intentions are to be taken as accountable, and that we cannot obtain accounts from the infant for the purposes of their actions (C. Trevarthen, personal communication, November 19, 1992). However, although the objection is perfectly right this is a retreat on the part of Trevarthen, that to some extent strengthen the positions of Stern and Kaye. The claims for early intersubjectivity are considerably weakened when the baby is reduced to a living being in need of human contact. Such a retreat also does not give full justice to the detailed descriptions of primary intersubjectivity provided in the seventies (notably Trevarthen, 1977).

I will here explore the possibilities of defending Trevarthen’s original claims. To this end, a closer scrutiny of the concept of intentionality is needed. I have devoted three papers to the issue of infant intentionality as raised by Trevarthen’s research. Two of them (Study I and Study II) discuss the definition of the concept of intentionality; the third (Study III) proposes a method for observation of infant intentionality founded on a redefinition of intentionality in terms to follow. This last paper also gives some results from observation of infant intentionality.

I will in the following first summarize the two theoretical papers and then make a synthesis of them, including also new elements which integrate the issue of intentionality into the more general issue of intersubjectivity, as presented above. After having also summarized the third, empirical paper, I will attempt a general conclusion from all three papers and the ideas presented here.
The Concept of Intentionality

The Problem of Infant Intentionality

(Summary of Study I)

It is generally recognized that 2-3 month-old babies engage in an elaborate social interaction with their caretakers. In such interaction, the parents usually behave as when interacting with a communicating partner. However, most infant researchers consider this to be some sort of pretense from the parent. He or she acts as if the infant was a communicating person, thereby implying both that the infant is not communicating and that this attitude from the parent promotes the infant’s development toward a communicating being. The main exception to this position is Trevarthen (e.g., 1977, 1978, 1979a, 1979b): Already at two months the infant shows its intentions to communicate. This is the basis for intersubjectivity, that both parent and infant have such intentions, and that they perceive each other’s intentions to communicate.

The paper continues by discussing how the question of infant intentionality should be approached in order to decide between “the as if-hypothesis” and Trevarthen’s description of early parent-infant interaction. In the interaction the parent can be said to attribute intentions to the infant, when he or she responds to the infant’s social behavior as to a verbal or gestural expression. That is, the parent focuses on the reasons the infant has to behave in a certain way, instead of interpreting the behavior as caused by some event out of the infant’s control. The distinction between reasons and causes of behavior is discussed in terms of different cues for the attribution of intentions. It is argued that content cues, that is, information on which specific intention the infant is supposed to have, is interpreted in terms of context and the parent’s preconceptions. Such cues can be validated only through asking the infant about his or her intentions, something which preverbal infant is unable to do. However, there are also “force cues” (cf. Packer, 1983), specifying that the infant is intentional, not which intention the infant has.

In view of the infinite variety of possible intentions, the validation of content cues can only be empirical. However, force cues, being considered as indicating a general property of the infant’s behavior, can rely on a concept validity, that is, they can be made dependent on a definition of intentionality in behavioral terms. The remainder of the paper discusses which definition of intentionality should be appropriate for studying infant development.

In infant research, intentionality is commonly defined in terms of goal directedness. This implies that analyses of the behavior is in terms of means-end relationships. Such analyses are rejected here as they cannot be made without recourse to content cues, that is, without asking what is the infant’s goal. An alternative definition is proposed in terms of behavioral object directedness. Arguments for such a definition can be found in Trevarthen’s own description of intentional infant behavior, in von Hofsten’s (1982) studies on infant grasping movements and, in particular, in the philosophical concept of intentionality, as elaborated by Merleau-Ponty.

Merleau-Ponty (1942/1963, p. 148ff) distinguishes between two different
principles of behavioral organization, one where the locus of control is in
the organism, and the other where the locus of control is in the environ-
ment. I propose that the former could be characterized as behavioral object
directedness. Merleau-Ponty conceives these two types of relationship
between organism and environment as being coexistent. However, one can
more or less dominate over the other, such that they might also be consid-
ered as constituting a bipolar continuous scale. The point is, that in spite of
the continuity between the two ways of relating to the world, that is in
behavior, there is somewhere along the scale a shift in the perception of the
behavior. Thus, while the behavior can be more or less controlled from
within, more or less driven by external stimuli on a more or less basis, it is
perceived either as intentional or as unintentional. This corresponds fairly
well to what has been referred to above as a force cue. It is suggested that
object directedness might be a property of an infant's behavior that makes a
parent, or an observer, perceive the infant as intentional.

The paper ends with an enlarged discussion of the philosophical concept
of intentionality in order to clarify my view on the relationship between
mental and behavioral intentionality, on intentional causation, and on the
principles for perception of intentionality. In particular I find it important
to argue, also within philosophy, against the conception of intentionality as
a specifically mental phenomenon, and in favor of conceiving intention-
ality as a property of behavior. As such intentionality should comply with
the KSD-principle proposed by Runeson and Frykholm (1983) and thus be
directly perceived.

**Intentionality and Representations**

*(Summary of Study II)*

The second paper develops a more principled criticism of the definition
of intentionality in terms of goal directedness. The dependency of goal
directedness on the concept of representation is pointed out. A goal is a goal
as long as it has not yet been attained. When it is attained, it is no longer a
goal3. A goal, therefore, only refers to a future state of affairs. As such it can
only be present, in the mind of the actor, through a representation.
However, von Hofsten (1985) and Valsiner (1987) show that it is not neces-
sary to conceive intentionality as goal directedness.

Representations also play another role in the discussion of infant inten-
tionality: Most infant researchers consider intentional action to be the ex-
ecution of a plan. Thus the action need to be represented somehow by the
organism. As an alternative to this view the Dynamic Systems Approach
(Thelen & Fogel, 1986; Thelen, Kelso, & Fogel, 1987; Fogel & Thelen, 1987)
proposes that the execution of an action is as much dependent on environ-
mental constraints as on several different anatomical structures, such as

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3 I would like to add something not pointed out in this paper: When the goal is a perceivable
object in the world, such as a cup to be reached, it should be considered as a goal only in the
sense "to be reached". It is not a goal in itself. Thus, it can be conceived as a goal only
relative to a future state of affairs. Here and now there is only an object for the grasping
movement of the actor. See also Study I (p. 11f) on the distinction between an intensional
and an intensional analysis of an action.
muscle groups and neurological structures. All this, taken together, is the material basis for the action and can, as such, therefore not be considered as a representation of the action.

There are two problems connected with the use of representations as a prerequisite for intentionality. When one explains an intention as caused by a representation, in the first place, the representation is included in the intention at the same time, because the intention is what it is in virtue of being a representation of the intended thing or state of affairs. There is no separation of cause and effect. Furthermore, when the representation itself is to be explained, this cannot be done without recourse to intentionality, and one is caught in an "intentional circle" (Searle, 1979). A representation is always a representation of something for someone, and this someone needs to be an intentional being in order to see a relationship between the representation and the thing represented.

It is not denied that there are intentions that can be described in terms of goal directedness, thus requiring representations. From a developmental point of view, however, such intentions are only possible for an organism already endowed with intentionality. Intentionality is a prerequisite for representations, not the other way round. Before having an intentionality capable of handling representations, therefore, the organism must develop a more basic form of intentionality. In Study I, I proposed that Merleau-Ponty's (1942/1963, 1945/1962) discussion of the relationship between organism and environment corresponds better to what Trevarthen describes as infant intentional behavior, than the traditional discussion in terms of means and ends. Also when it comes to handle the problem of an infant's mental representations Merleau-Ponty's approach seems to be the most appropriate. He conceives intentionality first and foremost as a property of behavior. Before intentions can be related to representations, they are related to real objects in the world. Thus, also from this vantage point I propose that a definition of intentionality as behavioral object directedness is adequate for studying the development of infant intentionality, as it does not assume that infants have mental representations.

Such a definition also offers the advantage of making intentionality directly accessible to observation. The combination of the KSD-principle (Runeson & Frykholm, 1983) and the Dynamic Systems Approach (Fogel & Thelen, 1987) allows for an explanation of the perception of intentionality in terms of the functioning of anatomical structures (coordinative structures, see Michaels & Carello, 1981, p. 146; also briefly defined in Study II, p. 434) relative to a specific object in the environment. The organism and the object form a system, however different from a purely mechanical system, such as a mass-spring system, through a dynamic quality that emanates from the fact that the organism actively adapts the behavior to the qualities and the behavior of the object. The organization of the coordinative structures thus generates naturally controlled behavior which kinematically can be described as object directedness. I propose that it is this quality of behavior that makes us perceive the behavior of another as steered by a will, that is, as intentional. Under this assumption I also propose a method for observation of infant intentionality that is to be presented in the third paper included in this thesis.
Infants and Refrigerators

In this section material from the two above summarized papers will be used in an enlarged discussion on infant intentionality, that also includes aspects not included in the two papers. The reader is asked to excuse some repetitions of what has been said in the summaries.

Above it was stated that there is good evidence for Trevarthen’s claims that emotions could be directly perceived. It has been suggested that intentions can also be directly perceived (Runeson & Frykholm, 1983), that they do not require inferential assumptions about inner mental states of the actor. Runeson has conducted studies where actors were instructed to walk in the manner of the opposite sex, that is, the actor should try to deceive observers about their sex. It was shown that the observers were able to perceive the actor’s intention to deceive.

It remains, however, to provide evidence for the perception of more specific intentions. In fact, that humans can be deceptive about their intentions is strong support for the mind-body distinction. That what we do can be quite another thing than what we think is often alleged as evidence that humans have a mind separated from the body, whether we act deceptively or we fail to act according to our intentions. The relationship between observable behavior and intentions is thus not always self evident. The validity of the attribution of an intention is therefore normally dependent upon the possibility of the actor accounting for his or her behavior. And infants cannot tell us about their intentions.

Two classical accounts of infant intentionality are given by Piaget and Bruner. Both infer intentionality from behavioral criteria to compensate for the impossibility to obtain an account from the infant. Piaget (1936/1963, p. 148) makes the separation of means and ends a criterion of intentionality; Bruner (1973, 1975, 1982) lists “several measurable features” of intentional infant behavior, which, however, also refers to the means-end relationship or to its constituents. Piaget considers the first signs of intentionality to emerge at about six months (fourth sensori-motor stage), Bruner is not explicit on age, but seems to have about the same age in mind. One very recent discussion of infant intentionality (Lewis, 1990a, 1990b), using the same concept of intentionality, makes it a distinctive feature of all living organisms, including vertebrates, thus having no problem in acknowledging its ubiquity in infancy. Powers (1973) extends the concept even further, making it a distinctive feature also of parts of an organism, down to the single cell.

All these authors share the view of intentionality as goal directedness. Piaget looks for when the baby is able to distinguish an action that is a means from the action that implies that the end (= goal) has been reached; for example, that the baby can remove an obstacle that makes the grasping of a desired toy possible. Bruner (1973) speaks of, for example, the “anticipation of the outcome of an act” and the “stop order defined by an end state”. Lewis (1990a) is explicit: all intentional behavior is goal directed, although there are different levels of goals, which makes the difference
between a plant and an infant, as well as between an infant and an adult. The crucial difference between "biological" intentionality, as it were, and "anthropomorphic" intentionality is the presence of representations in the latter. The goals at lower levels are built into the organism. (They might be analogous to what Trevarthen means when he talks about motives.) Due to an increased memory capacity, goals can be represented which allows for anticipation of goals (1990a, p. 243). It should be noted, however, that Lewis already talks about representations in relation to the lowest level of intentionality, namely the representation of desires; that is, the organism can distinguish between what is good and what is bad. This makes a straightforward connection to Powers, who conceives goal directedness in terms of negative feedback systems. Biological systems, (i.e., organisms and parts of organisms, down to single cells) behave purposively. As soon as the actual state of affairs does not correspond to the desired state of affairs, the organism (or the cell) behaves. Thus behavior is regulated by perception, such that the perception corresponds to what is good (= the goal) and that bad perception is terminated. What is represented in the system is a Sollwert, and goal directedness is the property of an organism that senses as disagreeable the difference between this Sollwert and an actual state of affairs, Iswert, and acts so that this difference is eliminated.

The problem of intentionality is frequently discussed in terms of a distinction. Roitblat (1990) distinguishes between intentions in a general or philosophical sense, meaning that mental states are about something and intentions in the specific or psychological sense, meaning that they are goal directed. Searle (1983, p. 3) distinguishes the familiar concept of intention, meaning the causal antecedent of an action, from the philosophical concept of intentionality, meaning the directed property of certain mental states. Shultz (1990) distinguishes between intentionality in a narrow sense, meaning mental states that guides or controls behavior, (i.e., goals) and intentionality in a broad sense, meaning mental awareness. Woolley & Wellman (1990) distinguishes between intention in the everyday or colloquial sense, involving a purpose of goal, and intention in the broader philosophical sense, that refers to mental states characterized as being about some external real-world object or state of affairs. All these distinctions seem to agree upon a distinction between intentionality as goal directedness and intentionality as a property of mental states to be about something, that is, intentionality as object directedness, a conception of intentionality founded in philosophy.

The philosophical term "intention" originates from the medieval, scholastic philosopher Thomas Aquinas, who considered intentio to be "the peculiar image or likeness formed in the soul in the process of acquiring knowledge, thus representing, as it were, a kind of distillate from the world outside" (Spiegelberg, 1982). Brentano (1874/1973, p. 88) picked up this scholastic concept, proposing it to name what he considered to be the main feature of mental phenomena, namely to be "the reference to a content, the directedness toward an object". However, for Brentano, the object of the mental is not an object of the outer world. Instead it is a represented "secondary" object that is "immanent" to the mind. Husserl, (e.g., 1913/1931) elaborated on the aspect of directedness in Brentano's proposals
by considering objects as targets of intentions, rather than immanent within mental activity. The difference between Brentano and Husserl thus amounts to Husserl stressing the activity aspect of intentionality, while Brentano tends to talk about intentional states.

Most proponents of the philosophical concept of intentionality (e.g., Searle, 1983) stick to Brentano's conception, making the intentional object the essential, or defining part of the mental state. Also having a goal implies being in a mental state. The Cartesian problem of the relation between body and mind reappears here as a problem of how mental states can cause behavioral action. Not many dare to defend an outright dualistic view, as Descartes does. Searle (1982) sees the solution in some kind of "blueprint" causality. I see the problem of mental causation as related to the idea that a mental state is a representation of a certain real state of affairs in the world that is desired (in the case of goal directedness) or thought of (in the broader philosophical sense of "intentionality").

The concept of representation thus seems crucial to all accounts of intentionality. Notably, when intentionality is conceived as goal directedness it is necessary to assume a representation that stands for the goal to be achieved, and that is compared to the actual state of affairs. To impute goal directedness to an organism implies imputing also either prewired representations or a capacity to form representations. If the representations are not prewired, that is, innate, it must be explained how they suddenly emerge in the organism. Lewis (1990a) tries to solve this problem by a model for the development of representations. All goals are desires of end states that they represent. However, many goals also contains knowledge states, and some even "cognitive states of consciousness or objective self-awareness" (p 239). The developmental perspective is thus satisfied through different levels of intentionality (actually five levels), distinguished among other things by an increased capacity to handle representations. Goals being defined as representations of desires ("ideas with emotion"), the developmental process amounts to changes from goals generated by biology, by the thought of the organism, and finally by self-awareness (p. 245). Thus, the development of intentionality, as described by Lewis, is a development of representations. No explanation is given, however, of how thought and self-awareness emerge.

There is also a problem of circularity in explaining intentionality in terms of representations, as these, in their turn presuppose intentionality (cf. Searle, 1979, p. 195-196). A representation — a re-presentation — stands for something else — it takes the place of the thing represented. For example, a representation of the goal stands for the desired state of affairs. However, this relationship between the representation and the represented state of affairs is entirely dependent upon an interpreter. That is, there must be someone making the connection between the representation and the state of affairs represented. This someone cannot be a something, it must be an intentional being.

The issue can be put in terms of a comparison between an organism and an inanimate negative feedback system. The refrigerator is constructed and calibrated to start cooling when the temperature rises above, for example, +4°C Celsius. The thermostat contains a device sensitive to temperature, for
example, a metal rod lengthens with increased warmth and becomes shorter with increased coldness. This device switches the electric current on, to start the compressor of the refrigerator, when the temperature rises above +4°, and switches the current off again, when the temperature has fallen back below +4°. The length of the rod has been set by the manufacturer to make the difference between above +4° or below +4° (= the "goal"), or the turning point for on/off switch can be set by the user. In any case, the representation is a representation for the manufacturer and the user, and not a representation for the refrigerator itself. The refrigerator does not understand what the difference between a short and a long rod means. A switch is simply turned on or off when changes in length passes a critical point.

The same reasoning can be applied to a simple or complex organism. The anatomy of the organism contains structures that make it react in specific ways under specific conditions and stop reacting when these conditions are changed in a specific way (i.e., when the "goal" is reached). But these anatomical structures in no way represent the external conditions to the organism. The organism has no goals. They may be representations for a possible creator, or for the researcher studying the functioning of the organism. However, the intentionality of the organism is never at issue, only the intentionality of the creator or of the researcher. The goal directedness of the organism is entirely in the mind of the researcher.

One reason for sticking to representations as a foundation of intentionality might be that intentionality is discussed in terms of the causes of behavior. Searle, in acknowledging the problems of using representations to explain intentionality, mentioned above, finds no solution to this "intentional circle" and states instead that we will have to live with it. It is the only way to give intentional explanations of behavior, that is, to find out how a mental entity, the intention, can cause a behavioral event (Searle, 1982, 1983). It is reminiscent of Descartes' problem of finding the connection between mind and body.

When Trevarthen explains the social behavior of the 2-3 months baby in terms of motives to communicate with persons (intersubjectivity, Trevarthen, 1980, p. 325) it is explicitly in causal terms. However, he is not explicit on whether motives are to be considered as mental states or only as physiological states of the brain. He discusses them in both kinds of terminology. A choice should be made. If they are to be considered as mental states (e.g., desires) then we have to face the problem of the intentional circle. If, on the other hand, motives simply refer to brain states, infants should be considered as no more intentional than refrigerators.

In attribution theory a distinction is made between causes of behavior in general and a particular type of causes that are named "reasons" (Buss, 1978; Kruglanski, 1979; Locke & Pennington, 1982; Zuckerman & Feldman, 1984). Consider, for example, a baby crying for hunger. The cry may be considered as caused directly by the hunger pangs, but might as well be a wish of the baby for alleviating them. The latter interpretation is distinguished from the former by saying that the baby has a reason for crying. The crying of the infant is then considered as an action, while in the former case it is considered as an occurrence, that is, a behavior out of the baby's control (Kruglanski, 1975, p. 389). The distinction between causes and reasons also
illuminates the mind-body distinction. “Ordinary” causes are physical or physiological causes, reasons are the causes of the mind. From where do the reasons come? Are they laid down in the structures of the brain? Or do they emerge at a certain level of complexity of these structures? Or, are they simply another “ghost in the machine” (Ryle, 1949/1973)?

The difficulties of the mind-body problem, since Descartes, might reside in this fruitless attempt to cross the mind-matter border in terms of a causal connection. Searle is fully committed to see the relationship between mind and behavior in causal terms, advocating a “blueprint causality” (Searle, 1982, p. 270ff; cf. also 1983, p. 85ff). Trevarthen (in press-a) considers motives to be mental functions that causes behavior. Lewis' (1990a) whole endeavor is devoted to elaborate an explanation of infant action in terms of intentional causation. He finds a motivating power in intentions by considering goals to be “ideas with emotions”, or desired ideas (Lewis, 1990a, p. 245). What is peculiar to intentional causation is that an intention both specifies its conditions of satisfaction, that is, the conditions fulfilling the intention (= the goal), and also brings about these conditions of satisfaction. It thereby becomes a cause that contains in itself a representation of its effect. The usual description of a causal relationship fails, as the description of the antecedents and of the consequences coincide. “He opened the door because he intended to open the door.”

Let us again compare intentional causality to the function of the refrigerator. The calibration of the thermostat is a physical constraint that switches the compressor on, when the temperature rises above a predetermined level and off when the temperature falls below that level. With an anthropomorphic language one could say that the goal of the refrigerator is to keep the temperature at a certain level, although most would agree that it would be imputing too much to the refrigerator. It is notable however, that the calibration of the thermostat is not the direct cause of the “behavior” of the refrigerator. I regard the goals of living organisms in the same way. The “goals” of organisms are no more causes of behavior than the thermostat of the refrigerator. They are rather constraints, that is, certain states of the organism, (physical, not mental states) that make the organism behave in certain manners under specific internal conditions (e.g., shortage of nourishment) or external conditions. If one is to identify isolated causes of the behavior (something which can be questioned, see Heft, 1989), such internal or external conditions are more appropriate candidates than the “goals”. Knowledge about the goal is nothing but a constraint that canalizes behavior when the need is perceived. This sounds primitive and mechanistic; there is no room for a free will in this account. What is the difference to the refrigerator?

Someone might object that the above description is valid for lower organisms, such as plants and lower animals, but certainly not for humans. In one sense, humans have a capacity for forming representations that lower animals do not have (level 3 and above in Lewis, 1990a, levels theory of intentionality). I agree, and will return to this point later. However, as stated above, when intentionality is dependent on a capacity to form and handle representations one is trapped by the circularity in the definition of the two concepts. Also, it poses the problem of how the developing human
is transformed from a non-intentional to an intentional being. I propose instead that this capacity occurs only when the intentionality of the infant is secured.

In this paper I propose that intentionality be conceived first and utmost as a relation between organism and environment. Merleau-Ponty (1942/1963, p. 148ff), in discussing the concept of behavior, uses an idea from Goldstein (1934, p. 307ff), who proposes that an organism relates to the environment basically in two ways: In front of a task that needs precision the organism has a high level of information intake from the environment and a high level of control of the behavior. Goldstein calls such behavior "flexing movements". A quite different way of relating to the world, called "stretching movements", is when the organism "lets the behavior go", as in yawning, when force is more important than precision, or when the organism reacts reflexively or automatically on an external stimulus. Goldstein points out that it is not a question of which muscles are used. It is rather a difference between different attitudes (Stellungsnahmen) of the whole organism relative to the environment. A flexing movement implies a high degree of information intake and the attuning to environmental constraints. In stretching movements, on the other hand, the organism acts upon the environment only on an emotional level, be it a emotional reaction upon an environmental event or an action upon the environment that is less sensible to feedback, like the concentration of effort in the lifting of an heavy object.

Merleau-Ponty seems not to conceive these two attitudes toward the world as a strict dichotomy. Rather there is a dialectical relationship between organism and environment, such that there may be a continuous interplay between control exerted by the organism and stimulus control. Which one dominates may therefore be a matter of degree rather than a matter of either-or. However, for Merleau-Ponty, as for Goldstein, the important thing is that behavior is more than a conglomeration of muscle movements, it has a structure, and it can be perceived as a Gestalt. Merleau-Ponty stresses the perceptual aspect of behavior, it is perceived either as controlled by the organism or as controlled by the environment, that is, as stimulus-driven. On the level of experience, this view can be compared to proposals put forth by Zajonc (1980), who distinguishes between thought and feeling by stating that thought is heavier in information while feelings are heavier on energy. I see in this distinction a new approach for differentiating between intentional and non-intentional behavior. One advantage of this approach is that the dynamic interaction between these two ways of relating to the world can hardly be imputed to a refrigerator or any other feedback-controlled mechanical device, such as a robot.

The main source of inspiration for Merleau-Ponty has been the phenomenology of Husserl. However, while not explaining intentions as caused by representations, the objects of the intentions were not, according to Husserl, objects of the real world, but constituted by the intentional act, and so, in psychological terms, Husserl's formulation also necessitates the assumption of mental representations as a substitute for the object in the real world. Merleau-Ponty saw the flaws of this doctrine and undertook an extensive criticism on the representationalist assumptions inherent in it.
(Merleau-Ponty, 1945/1962). Both the philosophical concept of intentionality and the narrower definition of the concept in terms of goal directedness, common in psychology, notably in studies of infant development, implies that intentionality is a quality of the mind or of consciousness. Merleau-Ponty proposes that consciousness is only one way of relating to the world, “a particular type of behavior” (1942/1963, p. 184). If one accepts this position, it would be reasonable to assume that consciousness is not the primary way of relating to the world, and that more palpable types of intentional behavior, notably motor behavior and perceptual behavior, make their appearance before consciousness.

Therefore, following Merleau-Ponty, I have proposed (Study I and Study II) that a definition of intentionality as behavioral object directedness is warranted for studying the development of infant intentionality. This definition subsumes the common understanding of intentionality as goal directedness under the general or philosophical concept as stated by Merleau-Ponty, thereby changing the focus from an assumed future orientation of the child that is difficult to defend without further insight into the child’s thinking. More importantly, it makes the concept independent of the concept of representation, thus avoiding the intentional circle, mentioned above. Instead of a focus on the relationship between intentional behavior and a representation, that cannot be observed, intentionality, understood as behavioral object directedness, implies a relationship between observable behavior and equally observable pieces of environment with which the infant interacts.

This approach does not deny the existence or the importance of mental representations. To be explicit, it is not denied that the child eventually handles mental representations (as does the researchers all the time). However, the concept of representation (for the child) is reserved to cases where some “mental” event, akin to behavioral action, such as the “silent utterance” of words (i.e., using language in thinking) or the formation of a mental image, stands for, that is, takes the place of some outer event or thing. Take as an example a representation of the goal that stands for the state of affairs to be achieved. This view is close to Piaget’s (1945/1951) concept of representation. However, the point here is that representations in this sense can be objects of intentions, in the same way as the child’s own behavioral action, as for example, the raising of an arm. The difference is that mental representations are not simple objects, but objects with “two faces”, one face standing for, pointing to, or referring to the other. In this respect mental representations do not differ from spoken words, or paintings, which are tangible representations.

The point, in this respect, with the approach I propose (Study I and Study II) is that before a child can have intentions directed toward mental representations, as when being goal directed, he or she must develop the capacity to direct intentions toward objects of the outer world, as when grasping a toy that is within reach. Mental representations thus should not be presup-

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4 Consciousness (Bewusstsein) is an important concept in Husserl’s phenomenology. Consciousness characterize mental states that are about something, that is, the intentional acts that are directed toward objects are conscious.
posed in explaining the development of intentionality. On the contrary, they can be assumed to rely on a more advanced or complex form of intentionality, developed out of more elementary forms, the latter aiming at objects in the physical world rather than at mental entities.

How then should the intentionality of behavior be characterized? When Kaye's and Stern's criteria of intersubjectivity were summarized above, only one criterion was identified as behavioral, namely orientation of behavior and attention (in the form of direction of gaze). The other two, knowledge of the other person's intentions and feelings, assume inner mental or emotional states of that person. As already mentioned, there is evidence that information about basic emotional states is readily picked up. It is not necessary to assume inner mental states. If the skill to pick up information on basic emotional states is prewired (cf. Dimberg, 1988, 1992) it can be assumed that infants are as ready to pick up that information as are adults, and that parents can pick up such information from infants as readily as from other adults.

While Runeson and Frykholm (1983) has shown that intention to deceive can be directly perceived, the perception and behavioral descriptions of more specific intentions wait for exploration. However, if intentionality, in contrast to specific intentions, is to be described, the matter might be different. The behavioral criteria proposed by Bruner (1973) might be accepted as criteria for the researcher under an inferential approach. However, they will be rejected here as they are subject to the criticism of the definition of intentionality as goal directedness mentioned above. The definition in terms of behavioral object directedness (Study I and Study II), however, can capitalize on one clear-cut criterion on intersubjectivity proposed by Kaye and Stern, namely orientation of behavior and attention. Behavioral object directedness evidently implies orientation of behavior and attention to the object of the infant's interest and activity. Furthermore, when it comes to concrete descriptions of intentional communication, Stern (1985) and Kaye (1982), as well as Trevarthen (1977) stress the orientation of the infant toward the parent.

However, behavioral orientation is not enough. Brazelton, Koslowski, and Main (1974) report different attitudes of the 2-3 months infant toward toys and toward the parent. When the infant is oriented toward toys he or she is reported to be jerky and uncontrolled in movements toward the toy and the attention is described as hooked to the toy. On the other hand, movements toward the parent are smooth and well attuned to the behavior of the parent. Later on the movements toward toys becomes much better controlled. These descriptions fit well with the distinction between the two ways of relating to the environment described by Goldstein (1934), mentioned above. The observations of Brazelton et al. might not hold as a clear cut distinction between behavior toward toys and toward parent at 2-3 months. However, they point to the shifting in control of the behavior, dependent on emotional state, that is ubiquitous among infants and which is also well known to adults. (That adults intend one thing and does quite another thing, as in deceit, is an other story. It is beyond the intentionality of infants.)
Thus, what distinguishes intentional from non-intentional behavior is the prevalence of information intake and control of behavior. Non-intentional behavior is mainly emotional, the stimulus dominates the behavior, as it were. Intentional behavior, on the contrary, implies control, both over information intake and over action. It might be described as smooth, as opposed to jerky movements. If it is assumed that infants are not able to intentionally do several different things at the same time, it also seems reasonable to describe intentionality as an unique organization of the behavior, and a good attunement of the behavior relative to an outer object. I propose that Goldstein's distinction be taken as a frame of reference for ratings of behavioral control. That is, the behavior is to be rated either as more or less subject to environmental or proprioceptive stimulation or as more or less outward directed, that is, voluntarily controlled.

In accordance with these considerations I propose (Study III) two criteria for intentional behavior, behavioral orientation and behavioral coherence. Both rely on a definition of intentionality as object directedness. The two criteria cannot be considered as independent of each other. They are rather to be considered as two aspects of the same thing, or as one and the same quality of behavior looked upon from two different perspectives.

It should be mentioned that the same criteria are used to cover the social and communicational intentions presumably deployed by the 2-3 months old infant and the "thing oriented" intentions at later ages. This lies behind the discussion below, on "social objects" (i.e., the parent) and "physical objects" (i.e., things).

With these criteria it should be possible to follow the development of infant intentionality, and to examine the substance of Trevarthen’s original claims that the infant shows communicative intentions already at 2-3 months. I consider that such claims are a necessary support for substance of primary intersubjectivity. Intersubjectivity implies a relation between subjects, and I claim that there are no subjects without intentionality, that is, without organisms endowed with a capacity for inner control of behavior.
The observation of infant intentionality
(Summary of Study III)

Method

A method for observation of infant intentionality has been developed, based on the definition of intentionality as object directedness. The behavioral criteria for intentional behavior thus defined are Behavioral Orientation and Behavioral Coherence. The latter is the label on an observational variable that was discussed above in terms of inner control of the behavior and its attunement to an outer object. It is labelled “coherence” because it assumes that the baby is not able to perform different actions in parallel with the same amount of intentional control. Therefore, the less focused on a single object, the less coherent is the behavior.

The method was elaborated using six parent-infant dyads. Each dyad was video recorded on six different sessions, covering infant age 12-36 weeks. The recordings were then grouped in pairs, thus constituting three age groups, 2-3, 4-5, and 6-8 months. The tapes were coded as to the occurrence of intentional infant behavior and parental reactions to infant behavior, intentional as well as non-intentional. The coding procedure involved the following steps:

1) The unit of analysis was defined as an identifiable infant behavior with a clear start and end. The criterion for an identifiable infant behavior was the observer’s perception of the behavior as controlled by the baby and aimed at a specific object. Each such unit was termed an “episode”. There were three kinds of such episodes: (A) Intentional infant behavior followed by a parental reaction. (B) Parental reaction following an infant behavior that is not classified as intentional. (C) Intentional infant behavior not followed by a parental reaction. The length of the episodes depended on the duration of the target infant behavior. (D) Furthermore, for each “regular” episode identified according to one of the above three criteria, a control episode of the same length was defined, without consideration of infant or parental behavior, as located at the midpoint between two regular episodes. (Figures 1 and 2 in Study III illustrates how episodes were defined and selected.)

2) The tapes were searched twice. In the first search every occurrence and length of intentional infant behavior was registered. In the second search each parental reaction was registered, as well as the length of the infant behavior eliciting the parental reaction. After the two searches, each recording was reviewed once more. On this review the episodes identified in the two searches were put on a common list together with the control episodes.

3) Each episode was then coded on four child variables and one parent variable. The child variables were:
   A. Occurrence/Non-occurrence of intentional behavior
      (The coding was based on the same criterion as the initial selection of episodes.)
   B. Intensity of attention, a four step rating scale
   C. Behavioral Coherence and attunement toward a possible outer object (see discussion above on Goldstein’s, 1934, distinction), also a four step rating scale
D. Behavioral Orientation or direction of attention

The parent variable was:

Parental response, covering the six following categories:

1. No parental reaction
2. "Yes" responses
3. Three categories of attribution of intentions:
   a) Attribution of perceptual intentions
   b) Attribution of social-communicative intentions
   c) Attribution of motor intentions, directed toward a physical object, in the
      following referred to as "physical intentions"
4. Other responses

Through summing the two variables Intensity of Attention and Behavioral Coherence, thus obtaining a 7-point scale (from 2 to 8 points), a measure of intentionality founded on the theoretical concept of object directedness is achieved. This derived variable is called Degree of Intentionality. For further details on the method, see Study III.

Results

Results are reported from a reliability study made on a sample of the analysed episodes, in order to evaluate the method. Then follows results from the main study on the issue of infant intentionality. Due to the exploratory character of the study the conclusions drawn from these results should only be considered as tentative.

Evaluation of the method

As the selection of episodes was considered to be only the first step in the identification of infant intentionality, its reliability was not checked. However, the codings of the selected episodes were submitted to a reliability study. For the infant variables, 40 episodes were randomly selected from all recordings pooled within each age group. For parental response 25 episodes was sampled in the same way. For further details of the procedure, see Study III.

The first infant variable, the dichotomous variable Occurrence/Non-occurrence of intentionality, showed a reasonably high agreement between the two observers, increasing from 75% (κ = .47) at 2-3 months to 78% (κ = .54) at 4-5 months, and to 93% (κ = .85) at 6-8 months. The results suggest that the behavior of the children becomes more and more distinct, and therefore easier to observe with increasing age.

The interobserver agreement of the Degree of Intentionality variable was computed through the intraclass correlation, ρ² (Suen & Ary, 1989) in order to check for observer bias. The value of ρ² decreased from .79 at 2-3 months, to .76 at 4-5 months, and to .73 at 6-8 months, due to less agreement on the component variable Behavioral Coherence at later ages. There was also a certain amount of observer bias on this variables at 2-3 and 6-8 months.
Nonetheless, a comparison between the *Occurrence/Non-occurrence* variable and the *Degree* variable gives a clear advantage to the latter when studying the intentionality at two to three months. This suggests that the less developed intentionality of the 2-3 months old baby gives more weight to the idiosyncratic perspectives of the observer having to classify the infant's behavior as either intentional or as non-intentional. The *Degree* variable, on the other hand, explicitly derived from the analysis of the concept of object directedness, seems to be sensitive both to fully-fledged intentionality and to its more rudimentary forms.

The reliability of the *Behavioral Orientation* variable and the *Parental Response* variable amounted to *κ* values ranging from .49 to .70.

**Organization of the data**

In the following report of the results from the main study, the two sessions from the same dyad within each age group are pooled. The purpose of this is first of all to average out differences due to incidental changes in the infant's mood and general well-being. Secondly, it is desirable to gather enough data points within each age group to search for differences among age groups due to a possible developmental trend. The results are mainly presented as prevalences (infant data) and as rates (parent and interaction data). Furthermore, as the control episodes can be considered to sample uncoded parts of the recordings, they were used to estimate the distribution of scores on the total recorded time within the age group.

**The development of infant intentionality**

According to traditional views, that is, defining intentionality in terms of goal directedness, infant intentionality cannot be regarded as a matter of degree. That is probably one reason behind the position that no infant intentions occur before 6 months (e.g., Kaye 1982). However, already the dichotomous *Occurrence/Non-occurrence* variable reveals an amount of intentionality at 2-3 months that cannot be neglected. The means (over children) of estimated prevalences were 19% of the recorded time at 2-3 months, 26% at 4-5 and 37% of the time at 6-8 months. This is certainly an increase over age, but not a shift from absence to presence of infant intentionality.

Treating intentionality as a graded variable completes the picture considerably. A mean on the degree variable was computed for each child within age groups, on the basis of estimated prevalences for each value on the degree scale. The means of these means increased from 4.53 at 2-3 months to 4.88 at 4-5 months, and to 5.28 at 6-8 months. However, when prevalences for each value on the Degree scale are compared among age groups (see Study III, Figure 3), the distribution of values has roughly the same form. Thus the Degree variable reveals the existence of a large extent of intentional behavior of a rudimentary kind, not captured by the dichotomous variable. (The means of estimated prevalence on the scale values 5 through 8 were 49% at 2-3 months, 56% at 4-5 months and 68% at 6-8 months.)
Social and physical orientation

Trevarthen describes the development of the infant’s intentionality, and intersubjectivity, in three stages. From two to three months, a period characterized by primary intersubjectivity, the intentions are mainly social, that is, they appear in social interaction with the mother without the inclusion of toys or other physical objects. From 4 months, as the infant more and more gains motor control, intentions toward toys and other physical objects dominate. At nine months, finally, the infant enters into secondary intersubjectivity implying a capacity to combine social intentions with intentions directed toward physical objects (for an overview, see Trevarthen, 1979b).

The observations reported above include codings that make it possible to examine the shift, described by Trevarthen, from a predominance of social intentions to a predominance of physical intentions between three and four months. Data on Behavioral Orientation reveal a clear shift in the time spent on social objects (i.e., the parent) and on physical objects, with a predominance of social objects at 2-3 months and a dominance of physical objects at 4-8 months (Study III, Figure 4). This shift is also reflected in the parent’s attributions of intentions, social attributions dominating at 2-3 months and physical attributions dominating from four months on (Study III, Figure 6). The shift seems even to be stronger on the behalf of the parent, as his or her sensitivity to the infant’s social orientation decreases with age, that is, the parent more and more ignores the infant’s social orientation, while the sensitivity to physical orientation increases (Study III, Figure 7).

The above results are thus in favor of the distinction described by Trevarthen. However, this conclusion is attenuated by some further observations. The distribution of prevalences on the Degree variable for social and physical orientation are almost equal (Study III, Figure 5). Also, at 2-3 months, the parent is no less sensitive to physical than to social orientation of the child (Figure 7). Analysis of the relationship between parental attributions of intentions and the degree of the infant’s intentionality points in the same direction. “The rare cases of physical attributions at 2-3 months are no less related to high scores on the Degree of Intentionality variable than the social attributions (compare social and physical attributions in Figure 8). Rather than a shift, these results thus point to a development that involves a specific decrease and a virtual disappearance of social attributions; although the physical attributions certainly are rare at 2-3 months, they can be, from the beginning, as related to a high degree of intentionality as the social attributions” (Study III, p. 29).

The relationship between infant intentionality and the parent’s attribution of intentions to the infant.

In accordance with the position that no intentional infant behavior occurs before 6 months, many infant researchers stress that when mothers attribute intentions to their baby before that age they behave as if the baby is endowed with intentionality. This view, which I call “the as if-hypothesis” is presented in a particularly clear way by Kaye (1982). It is in clear opposition to Trevarthen’s description of the interaction between mother and
infant at 2-3 months, characterized by primary intersubjectivity. The above presented method for observation of infant intentionality gives an opportunity to illuminate this issue from the approach of defining intentionality as object directedness. It should be recalled that Kaye himself, when it comes to concrete descriptions of intentional behavior, uses behavior criteria closer to object directedness than to goal directedness.

The above presented results on the prevalences along the Degree of Intentionality scale (Study III, Figure 3) show that the opportunities for the parent to attribute intentions to clearly non-intentional infant behavior are limited. Furthermore, although there is a clear increase in the amount and level of intentional behavior, there is no dramatic change in this respect between the age groups. Even stronger evidence in favor of Trevarthen’s description is obtained when looking at the relationship between the actual attributions registered through the codings and the degree of intentionality scored by the infant behavior eliciting the attribution (Study III, Figure 8). The likelihood that the parent shall attribute an intention to the infant seems to be related to how intentional the infant’s behavior is. This is particularly true for the social attributions at 2-3 months, that is, for the interaction characterized by Trevarthen as primary intersubjectivity.

Summary Conclusions from the Empirical Study

This empirical study demonstrates how the concept of intentionality, defined as object directedness, can be used to describe the development of infant intentionality. The results seem to be quite robust, in spite of the exploratory character of the study. They show that the proposed definition can be tied to empirical data in a much more direct way than a definition in terms of goal directedness. The Degree of Intentionality variable revealed a considerable amount of rudimentary intentionality, thus supporting Trevarthen’s initial claims that “infants do act with rudimentary intentionality” (Trevarthen, 1978). Limited support is also provided for a distinction between an early phase of social-communicative intentionality and a subsequent phase of thing-oriented intentionality. Finally, analysis of the relations between infant behavior and the parent’s responses shows that, over all age groups, the higher the degree of intentionality, the stronger is the inclination of the parent to attribute intentions to the infant’s behavior.
General conclusion

Intentionality as a Prerequisite for the Emergence of Intersubjectivity

The definition of intentionality as object directedness implies that the organism has control over information intake and behavior. Such control is assumed to be a prerequisite for perceiving the infant, as well as any other organism, as acting wilfully. I thus suggest a material basis for the parent to perceive the infant as an intentional being, and by that also to perceive him or her as a subject, as a person. I will here discuss the relevance of these proposals for the emergence of intersubjectivity and a sense of self, that is, of the infant’s ego. Stern’s (1985) and Kaye’s (1982) criticism of Trevarthen’s ideas on intersubjectivity between parent and infant at the age two to three months will be reviewed in the light of the definition of intentionality proposed here and the observations made on the basis of the definition.

Stern talks about a sense of a subjective self as a prerequisite for intersubjectivity, and refers to Trevarthen and Hubley’s (1978, p. 184) definition of secondary intersubjectivity as “a deliberately sought sharing of experiences about events and things” as the definition of true intersubjectivity (Stern, 1985, p. 128). This sense of self includes subjective mental states. When the child is capable of “holding in mind” intentions or affects, he or she can also relate mentally to others, that is, share experiences with others. The problem then is to know how the sense of self emerges.

Stern (1985, p. 69) gives a description of the interpersonal qualifications of the two to three months old infant that is very close to Trevarthen’s description of primary intersubjectivity. However, the description is repeatedly qualified by “as if”, “seem”, and “appear”. These qualifications form the basis for the development of a sense of a core self and of core others. The sense, that is, the experiential part of the emergence of the self, comes from the experience of self-agency, of self-coherence, of self-affectivity, and of self-history (i.e., memory). As the sense of self develops, the sense of others follows, as “the opposite side of the same coin” (Stern, 1985, p. 70). Self-agency is mainly discussed in relation to physical objects, while self-coherence is discussed mainly in relation to persons. Self-affectivity and self-history, on the other hand, are considered as purely internal experiences.

By considering the sense of self and of other as two sides of the same coin, Stern blurs the difference between experiencing another person, and experiencing oneself. Implicit in Stern’s approach is the idea that the sense of self emerges from within, as it were. Stern’s discussion of the experience of self-coherence contains, however, very interesting ideas on the perception of the other as a centre of activity, with unity of locus, coherence of motion, of temporal structure, and so on. These ideas nicely complement my own description of object directedness as direction of attention and behavioral coherence. Thus, experiencing “the core other” is an easily understandable matter. It is simply perception! Experiencing one’s own self, in a however basic way it may be, requires something much more advanced, namely a capacity for reflection, in self-activity etc., provided that the sense of self emerges from within, as Stern seems to imply. The baby would then dis-
cover the self in his or her actions, in his or her emotions and memories. It can be noted that Trevarthen and Hubley (1978, p. 213) considers self-reflection as a special mode of innate intentionality. Whether this capacity for reflection is innate or acquired, it seems reasonable to assume that it should benefit from the infant being treated as another person by the parent. And I see a crucial difference between treating the baby as if he or she is a person on the one hand, and responding to the coherence, object directedness, or other signs of intentionality in the infant, that is, responding on the basis of perceiving the infant as a person, as a subject. By being a subject the infant can enter into intersubjective interaction with the parent.

Then, does a two to three months old infant act as a subject? Yes, my observations support the position that the baby acts with intentionality in a sense that is in perfect agreement with Sterns description of self-activity and of self-coherence, with the important complement that the activity is related to specific objects in the outer world, whether persons of physical objects.

Furthermore, parent and infant in interaction treat each other as subjects. My observations give evidence that the parent predominantly attributes intentions to intentional infant behavior. Well known evidence from different quarters supports the position that the infant is sensitive to the intentionality of the mother, e.g., Trevarthen's (1977) description of mother-infant interaction, Murray and Trevarthen (1985) on distortions of parents reactions toward the baby, and Bateson's (1975) account on turn-taking. All this evidence substantiates the reciprocity in the interaction which justifies Trevarthen's calling it primary intersubjectivity.

Kaye (1982) understands intersubjectivity as "shared understanding between individuals" (p. 32), which presupposes representations. Representations are the vehicles of thought, and shared understanding means having access to one another's thoughts. Kaye cautions (p. 128) that he does not want to discuss different uses of the word "intersubjectivity". The issue is how infants come to share meaning with others, and when they are able to do so.

It would be easy to dismiss Kaye's criticism of Trevarthen's use of "intersubjectivity" as a simple disagreement on how the word should be used. Like Stern, Kaye considers that only secondary intersubjectivity is true intersubjectivity. However, the more important issue for Kaye is the role of innateness and environment in the acquisition of shared meaning. He strongly advocates the role of the parent in promoting the infant capacity to share meaning and severely criticizes the ideas on the unfolding or maturation of innate propensities of the infant to share experiences and hence to become a subject participating in social interaction.

As mentioned above, Kaye requires the infant to have an intention to convey his or her feelings to the parent in order for true shared meaning to be present. And that is possible only when the infant understands that the emotional expression means the same to the parent as to the infant. Shared meaning thus requires intentionality.

However, he somehow contradicts himself. On the one hand, he says that a two months old infant does act intentionally toward physical objects (Kaye, 1982, p. 48, p. 66). On the other, he states that infant facial expressions, vocalizations, and hand movements — resembling gestures — are
responded to by the parent *as if* they were communicative intentions (Kaye, 1982, p. 142ff). Kaye seems to consider the infant as having physical but not social intentions at that age. Or, maybe he requires more of a social intention than of a physical intention. My observations show that there is no difference in the quality of the social and the physical intentionality at two to three months (Study III, Figure 5). The infant's social behavior has the same degree of intentionality as the behavior directed toward things.

I would certainly agree that there is no sharing of physical intentions at that age. In Trevarthen's terminology, secondary intersubjectivity will have to wait until the age of nine months. As mentioned above, secondary intersubjectivity implies a coordination of communicative intentions with intentions directed toward physical objects, making the communication be *about* the physical objects. Kaye's concept of representation seems to be not too far from mine; we are both inspired by Piaget. Unlike Piaget and Kaye, however, I view representations as *stand-in objects*, toward which intentions can be directed, in a way that correspond to how intentions are directed toward the represented real objects. So when the baby can have a representation of a feeling, he can intentionally tell the parent that he is glad or sad. The represented feeling becomes the intended “physical” object which is combined with a communicative intention. I don't find it unlikely that such a capacity occurs concordently with the understanding that the conveying expression means the same to the parent as to the baby.

The intentions of secondary intersubjectivity are complex intentions. The intentions directed toward physical objects, by Kaye admittedly occurring already at two months, are simple and not based upon representations. No representation is needed, as the intentional action aims at the material object itself (see Study II). I think it is fair also to consider the infant's social and emotional expressions, *aimed at the parent*, as no less intentional than the grasping movements aimed at a toy within reach. One could be in doubt about the goal or the meaning of an infant's gentle vocalization toward the parent. Yet the goals imputed to actions directed toward physical objects often are no more than conjectures. Forget about goals, and look instead at the infant's control of the behavior and the use it makes of information on the object, whether a parent or a physical object, in regulating the behavior!

Control of behavior and extensive use of information make the infant a subject in a large and fundamental sense. It is, in fact, also what makes an object out of the piece of environment toward which the behavior is directed. Furthermore, when this object is another subject, and the infant attunes its action to the subjectivity of the other, there is intersubjectivity in the same large and fundamental sense.

When Stern and Kaye base intersubjectivity on a capacity to understand that one's own and another person's inner mental states can be the same, thus gainsaying Trevarthen's proposals on primary intersubjectivity, they rid themselves of an interesting approach to the development of the ego. This approach focuses on what Merleau-Ponty called the perception of the other as a perceiver. I translate that to mean to perceive the other as an agent, and thereby as a behavioral subject.
Trevarthen’s descriptions of mother-infant interaction support Merleau-Ponty’s proposals that there is no solus ipse at the outset. Subjectivity in Trevarthen’s sense, that is, the fact that the infant and the parent are, with Merleau-Ponty’s words, perceivers, in other words, actors, is a prerequisite to intersubjectivity. This is a logical necessity, while there can be no intersubjectivity if there are no (at least two) subjects. However, the challenging idea that follows from Merleau-Ponty’s discussion of the problem of solipsism is how the mental subject emerges, that is, how the infant comes to experience himself or herself as a subject. It seems reasonable to think that this experience comes, not from the experience of others as subjects, but from the experience of self and another in interaction. It is in this sense Merleau-Ponty’s proposition that intersubjectivity is a prerequisite for subjectivity should be understood.

Thus, not only is subjectivity, in Trevarthen’s sense, a prerequisite for intersubjectivity. But primary intersubjectivity, as Trevarthen calls it, is also a prerequisite for sense of a subjective self, as expressed by Stern, that is, intersubjectivity is a prerequisite for the experience of self, whether core self or elaborate self. That also means that it is a prerequisite for secondary intersubjectivity in Trevarthen’s model for the development of the infant’s intentionality. By that fact it might also contribute to the understanding of how mental representations emerge. If the dualistic Cartesian position is abandoned, a better understanding can be reached of the infant’s cognitive development.
References


