DEIXIS AND SPATIAL ORIENTATION IN ROUTE DIRECTIONS

Wolfgang Klein

Max-Planck-Institut für Psycholinguistik

Nijmegen,Netherlands

Allwo dort die schönen Trompeten blasen,
Da ist mein Haus, mein Haus von grünem Rasen.

INTRODUCTION

All natural languages allow reference to places, ex-
pression of spatial relations and localization of objects
and events. The specific devices which they have developed
to that purpose vary considerably. This may also be true
for the underlying concept of space (Malotki, 1979), but
there are some general features, as well. Two of them are
particularly relevant to the question of how human exper-
ience is reflected in language structure. First, place ref-
erence, or local reference, is typically not obligatory.
Its expression or lack thereof is left up to the speaker.
Temporal reference, on the other hand, is very often obli-
gatory. It is a built-in feature of many languages. With a
a few exceptions, utterances in these languages will be
"tensed." Second, all languages exhibit two strategies of
local (and often other) reference, one of them rooted in
the actual speech situation (deictic reference) and the
other one not.

I have nothing to say here about the asymmetry between
temporal and local reference, except that it is a mystery
and casts some doubt on the truism that time and space are
equally fundamental categories of human experience: at
least, the marks they have left in the structure of very
many languages, including the familiar Indoeuropean

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languages, are not equally deep.[1] The difference between
deictic and non-deictic reference is best exemplified by
two series of expressions. The references of "here," "there,"
"left," "right," "on the other side," "yonder," etc. crucial-
ly depend on the position of the speaker at the time of utter-
ance, that is, on factors of the actual speech situation. The
references of "in Minneapolis," "east of Eden," "where the
beautiful trumpets are blown," etc. are independent of the
speaker's position. Closer inspection shows that the dis-
tinction between deictic and non-deictic reference raises
many problems and that both procedures are based on a com-
plex interplay between linguistic and contextual knowledge.

This paper deals with one of these procedures, namely
local deixis. First, I shall briefly outline some of the
components that, in my view, are involved in the use of
deictic expressions. It is not my aim to develop, or even
to sketch, a new theory of deixis, but to point out some
necessary prerequisites for such a theory, and to emphasize
the need for the empirical study of deictic phenomena in
actual language use. Then, some results of an empirical
study about the use of spatial expressions in route direc-
tions will be reported. This study is based on authentic
route directions in a German city. It will be complemented
in the final section of the paper by some findings about
route directions in children based on a more controlled
study.

SOME PREREQUISITES FOR THE ANALYSIS OF LOCAL DEIXIS

Prelude

We can refer. The classical examples of referring ex-
pressions are proper names, like "John," and definite de-
scriptions, like "the Queen of England." Using these

[1]At least in psychological literature, no priority
whatsoever is given to time, and thus, it seems justified to
speak of a truism. Kant, on the other hand, in his famous
treatment of time and space, clearly states such a priority:
"Die Zeit is die formale Bedingung aller Erscheinungen
überhaupt. Der Raum, als die reine Form aller äußeren
Anschauung ist als Bedingung a priori bloß auf äußere
Erscheinungen eingeschränkt." (Kritik der reinen Vernunft,
Transzendentale Ästhetik, p. 6).

expressions in an utterance is not enough for successful
reference; there are millions of Johns, and there have been
up to now five Queens of England. But an utterance is reg-
ularly embedded in a discourse context, and such a context
puts strong restrictions on the possible referent. Success-
ful reference in natural language always results from an
interplay between contextual information and information
provided by the referring expression itself. It may be that
the context leaves certain options, that is, several Johns,
or several Queens of England might be at issue when the ref-
erence has to be made. In this case, the information given
in the utterance has to be extended, for example, by saying
"your uncle John" or "the present Queen of England." The
additional expressions "your uncle" and "present" link
"John" and "Queen of England" to factors of the speech act;
namely to the listener and to the time of utterance, by
which it is assumed that they are determined. Relating
expressions to the speech act itself is one of the most
common devices of natural language for establishing refer-
ence. There are other possibilities, for example, mention-
ing more and more attributes of the intended referent, such
as "that John who..." or "that Queen of England who...."
Following Bühler (1934), we might call these techniques
"deictic" and "symbolic," respectively. Both techniques
are often applied simultaneously, such as in "your uncle,"
in which "your" plays the deictic part and "uncle" the non-
deictic or symbolic part. This interplay is just one ex-
ample of the general interaction between contextual infor-
mation and information expressed in the utterance, which
characterizes the functioning of natural language.

     The role of deictic expressions like "your" or "present"
is that of linking the information expressed in the proper
name (or the definite description) to some component of the
context—more specifically: situational information, namely
the "listener ("your") or the time of utterance ("present");
they are mere aids for unique identification of entities
which, as such, are well-distinguished. That is, there
are millions of beings to which the name "John" applies,
but there is no doubt that these beings are distinct in
various properties, and either by naming the specific
properties of one of them, or by characterizing it with
respect to situational factors, the referent is identifi-
able. But the role of deixis goes beyond that of being a
descriptive aid. Our concept of "individual" itself and
hence of the possible objects of reference crucially depends

on deictic features.

Close your eyes and imagine a little red square. Fine.
You are reading again, I presume. Now, keep the square,
close your eyes again (not yet) and imagine a second, iden-
tical square beside it (now). Now you can open your eyes
again.

The two squares only exist in your imagination. No one
but you knows their exact size or their exact colour. But I
can refer to them. I can say, for example, "Think them away."
Then, "them" means "the two little red squares which I asked
you to imagine." I can also refer to either of them indi-
vidually, although they are identical in all their attri-
butes: they are both little, red, rectangular, and have
sides of equal length. So, I can't use their properties.
I can't use their position, as I could do if they were
drawn on a blackboard or printed in a textbook. They have
no material substance which would "individualize" them,
according to a classical doctrine ("materia est principium
individuationis"). They have no names, and no definite
description using their attributes, like shape, size,
color, can distinguish them. Individuum ineffabile est.

The only way to keep them separate and to refer to them
individually is through deixis. I can say, for example,
"Erase the first square" or, "Put a triangle on that
square which, in your view, is on the left*" The expressions
"first" and "in your view on the left" relate the square in
question to factors of the speech act. The only "properties"
which make the squares two individuals, two different enti-
ties in the set of possible referents, are deictic features.

These brief and rather superficial considerations may
suffice to illustrate two points. First, that natural lan-
guage use is characterized by a persistent linking to the
here and now of the utterance itself, and second, that this
linkage is not specific to language use but rather a gener-
al feature of human cognition.

Both claims are rather unspecified. In the following
paragraphs, I shall try to detail the first of them. The
second aspect will not be dealt with systematically, but
will be touched upon at various points.

Contextual Information and Expression Information

     The content of some expressions ("expression informa-
tion") is integrated into the general flow of information
one dispenses. Let us call this information "contextual
information." For heuristic purposes, it is possible to
distinguish three types of contextual information:

     1. One may be derived from the immediate verbal con-
text, that is, the immediately preceding and possibly the
immediately following utterances. A most typical case, in
which information derived from verbal context plays a cru-
cial role is that of anaphoric devices. In "My father is
a fool, because he married my mother," the anaphoric ele-
ment "he" only expressed, qua expression information, is
something like "male person," but it takes up the information
introduced by the expression "my father." The expression
information introduced by "my father" functions as contex-
tual information for everything that follows.

     2. Another may be derived from the perceivable situ-
ation in which the utterance is made, that is, from the
speech act and the various factors that constitute it. We
may perceive who is speaking, who is addressed, who else is
present, where the utterance is made and when. This infor-
mation which is given by immediate perception in the speech
act is the root of the whole deictic mechanism.

     3. And another may be derived from what we have expe-
rienced or fancied before, stored in our memory and activated
at the occasion of the speech act. That is, this information
is part of what is sometimes labelled "world knowledge" or
"factual knowledge." Information of this sort also plays
a crucial role in deixis, as we shall try to show now.

     Deixis is one special device used in integrating ex-
pression information (as expressed by words like "here,"
"there," "left," etc. in the case of local deixis) into the
whole of contextual information. To illustrate with a sim-
ple instance: Suppose someone says in a certain situation
"I like it here." Knowing English and thus knowing what
the expression "here" means is not sufficient to understand
where that person likes it. "Here" by and large means "at
a place close to the position of the speaker." Hence, in
order to understand what is referred to by the speaker, we
must know his position which could be supplied by perception

in that situation. But such information is not enough.
"Here" could mean "in this chair where 1 am sitting," "in this
corner of the room," "in this street," "in this city," "on
earth." Hence, we must know what the possible denotata—var-
ious places in this case—are, and moreover, we must have some
additional information which selects the "border" of the
supplied by verbal or by perceptual context. For example, if
is given by our world knowledge, which tells us that the
referential domain — the deictic space — is structured in
a certain way. The second kind of information is usually
supplied by verbal or by perceptual context. For example, if
the speaker of "I like it here" is sitting on the floor and
was just offered a chair, his utterance is most likely under-
stood as, "I like it on the floor," but not "I like it in
New York," whereas this interpretation would be far more
plausible if, in the same situation, he was asked, "How do
you find New York?" (assuming that he is there at the time
of the utterance). So far, we have four components which
contribute to the functioning of deixis:

    1. A basic reference point which, at least in this case,
is the position of the speaker. Following Bühler's (1934)
terminology, we shall call this basic reference point the
origo of — in this case — local deixis.[2] It constantly
changes, of course, and the necessary information about what
the origo of some utterance is, is supplied by perception.

    2. A deictic space, that is a set of possible refer-
ents (places in this case). This set has a certain struc-
ture, e.g., some of its elements are enclosed in others,
relations like "close to" must be defined, etc. This infor-
mation is supplied by our general knowledge of the world.

    3. Some delimitation principles which allow us, in a
given situation, to determine how far the borders of the
"here" should be drawn. The necessary information has to
be derived from previous utterances or from situational
context.

    A. The lexical meaning of the expression in question.
"Here," for example, means a place close to the speaker, etc.
We know these meanings simply because we know the language.

    In what follows I usually shall speak of "deixis"
rather than more accurately of "local deixis" or "place
deixis."

Determination of origo, deictic space, delimitation prin-
ciples, and lexical meanings of the expressions used is a
necessary presupposition for the functioning of local deixis.
But there may be several extensions and complications. First,
the origo may be shifted, that is, another reference point
may be introduced. Second, the deictic space may be of a
much more abstract kind than the one we have considered in
the above example; as a consequence, the denotata of the
deictic expressions may be of a much more abstract kind.
Third, it may be that there is no immediate reference at all,
but rather reference to elements in a first deictic space, to
which other elements in a second deictic space are associated.
This happens for example, when we point to a place on a map
and say: "Here is my house." What we really refer to is
not the red spot on the map, but some counterpart (analogue)
which this spot has in reality (analogical deixis). In what
follows, we shall consider the four basic components in turn,
together with some possible extensions and complications. We
then will briefly turn to analogical deixis.

Deictic Space

     The prototypical deictic space. By deictic space, I
mean the structured set of possible denotata of deictic
expressions. These possible denotata are places, at least
in the most straightforward case, such as rooms, apartments,
houses, quarters, towns, countries, planets, galaxies.[3] That
is, the deictic space is our mental representation of the
physical space as structured by visual perception, by our
geographical knowledge and maybe other kinds of knowledge
about the structure of this space. The possible denotata,
then, are more or less delimited subspaces of this space.
The deictic space is not the physical space itself, but a
mental representation of it. Consequently, deictic spaces
may be different for different people, for children and
adults, for people with extended geographical knowledge and

     [3] I am neglecting here the fact that many local deictic
expressions are adverbials, which, apart from referring to
their denotatum, express a certain local relation to that
denotatum, e.g., being in x, on x, etc. This point is not
particularly relevant to our present concern, though it is
surely relevant to the general problem of how locality is
conceived or and expressed in language. See the contri-
bution of Talmy in this volume.

without such knowledge, etc. For successful communication, the deictic spaces of speaker and listener need not be identical—they probably never are—but they must be sufficiently similar, and to make them so is often a part of the communication itself. This is the usual case in route directions, as we shall see below.

There is a vast literature on mental representation of physical space. I cannot deal here with the various issues raised there, but there are three points which should be mentioned. They are concerned with features necessary for the functioning of local deixis in this deictic space:

1. The deictic space must have a topological structure. We are clearly able to say that certain subspaces are completely within other subspaces, or that they partly overlap, etc.

2. The deictic space must have a kind of metric measure. We definitely have a concept of distance for different subspaces. Otherwise, the distinction between different deictic expressions would be pointless. The difference in meaning between "here" and "there" obviously has to do with one's varying distance to the position of the speaker. The precise nature of this metric measure is unclear, however.

3. The deictic space must have directions, since otherwise it would ne impossible to distinguish the meaning of deictic expressions like "left" and "right," "above" and "below," "before" and "behind."

<u>Extensions</u>. There are a number of cases in which deictic expressions like "here" etc. do not refer to places within physical space (or more accurately, to their mental representations) at all. A typical instance is the sentence which occurred above: "I cannot deal here with the various issues raised there." In this case "here" means something like "in this paper," and "there" means something like "in the vast literature on mental representation of physical space." They do not refer to any locality or place in the literal sense, but to very abstract "places" within a train of thought, an academic tradition of thinking, or whatever the referential domain might be here.

There are cases between (the mental representation of) physical space and the very abstract spaces of the latter

example. Take for instance a sentence like: "In 1927, Car-
nap joined the Vienna circle. Here, he first became acquaint-
ed with...." Obviously, the Vienna circle is not a place in
physical space, but it seems less abstract than the entity
referred to in utterances like "I can't go into detail here."

     Uses of the latter kind may be called "derived" or "meta-
phorical;" this is perhaps correct, but it does not say very
much. What we need is an investigation of the cognitive or
semantic operations that characterize these (and perhaps
other) transitions from representations of physical space—
as they are built up and structured by every non-handicapped
person—to these much more abstract spaces. I have no idea
what the precise nature of these operations is.

<center>Origo</center>

     <u>The prototypical origo</u>. In the unmarked case—that
is, if nothing else is mentioned—the basic reference point
is the position, or rather the orientation, of the speaker
at the time of utterance. In a speaking situation, each par-
ticipant has at every moment a specific orientation deter-
mined by his position and the direction of gaze. The deter-
mination of referents is specified by the orientation of the
speaker: "here," by and large, refers to a subspace which
includes the position of the speaker, whereas "there" refers
to a subspace which does not contain the position of the
speaker. "Left," by and large, is determined by the speaker's
direction of gaze; it refers to a very diffuse subspace
which, among other things, is closer to that side of his body
where his heart is likely to be. We will come back to this
point in the next section.

     Both position and direction of gaze may constantly
change, either because the speaker himself changes them or
because the speaker's role is taken over by someone else.
The necessary information about the nature of present origo
is supplied by perception. This obviously requires that the
speaker can be localized in the deictic space, otherwise
the origo must be explicitly introduced. But even if the
position of the speaker is clear, a different point which
then counts as origo can be introduced. This leads us to
various complications. There are a variety of possibilities
for deviating from the usual, unmarked origo and for intro-
ducing new reference points. Three of them seem particularly
worthy of discussion and in addition, I shall briefly con-
sider a fourth case which goes beyond deixis proper.

1. Speech-act-bound origo shift: In a speech situation, every participant brings his own orientation. The one which counts for deixis depends on who is currently speaking. That is, those who are listeners have to take over the orientation of the person who is speaking. Since the orientation of the different participants often differ in irrelevant aspects, this is usually not a problem. There are some cases, however, in which it is the listener's orientation that matters. A typical example would be instructions. For example, if somebody facing somebody else says "Move a bit to the left," it is always meant "left from the listener's position." Since the speaker is facing the listener, the subspace denoted by "left" would correspond to the speaker's "right." We shall see in the third section that this kind of "perspective taking" is the norm in route directions. There are other, less obvious and more confusing cases. Take the following familiar after-lunch utterances: "You have a crumb on your chin. No, more to the right. No, still more to the right. Okay, it's gone." In this case, "to the right" may be interpreted from the speaker's or from the listener's point of view; this may lead to confusion and, as a consequence, to explicit marking of the relevant orientation. The common denominator of these cases is that the speaker guides actions to be performed by the listener, and he directs them from the point of view of the person who has to do them, not from his own. "Origo shift" from speaker to listener seems so common in these "directive" contexts that most often it need not be explicitly marked. It can be marked, of course, if there is some ambiguity; this may happen if the directive character of the utterance is less obvious, such as in the crumb example. We may call this kind of deviation from the normal origo a "speech-act-bound origo shift."

2. Origo shift by pointing: It is possible to introduce a new reference point by a pointing gesture. This happens in utterances like "I would like it better if the door here (pointing) were over there (pointing)." Cases of this sort may correspond to the most literal sense of "deictic" (pointing), but what really happens here is not clear. Rather than claiming that the origo is shifted in these cases, we might argue that both "here" and "there" refer to subspaces which have no immediate link to any origo. The subspace is simply identified by the pointing gesture. But then, the <u>linguistic meaning</u> of "here," rather than its denotatum would be different in different contexts. This is clearly an undesirable consequence.

3. Origo shift by verbal context (anaphoric use): It is also possible, and much more common, to let the denotatum of "here" and "there" depend on some previously introduced referent. This amounts to what is often called "anaphoric use" of deictic expressions. A typical example is "In the evening, we arrived at Heidelberg. Here, we immediately...." This "here" means approximately the same as "in Heidelberg;" it is a kind of anaphoric expression for "Heidelberg." In this context the term "there" may be substituted for "here," and we are faced with the same problem as in (2) above. For the same reason given above, I would prefer to speak of a "shifted origo." In both cases, the origo collapses with the whole denotatum. This constitutes no problem if we assume that the meaning of "here" is approximately "subspace including the origo." How far the borders of this subspace reach and whether or not they include something different from the origo, is left open.

4. Intrinsic origo (non-deictic origo I): In many cases, it is not the constantly varying position of the speaker which is important, but the habitual, frozen position of an individual or object. A car, for example, has a right side and a left side. Sides are defined by the standard position of the driver. It is often said that a car has an "intrinsic" orientation (Miller & Johnson-Laird, 1976). If somebody' is standing beside a car and the speaker is standing in front of the car, he may either say: "He is standing to the left of the car" or "He is standing on the right side of the car." In the first case, he uses the unmarked origo—his own position. In the second case, he uses the intrinsic origo In a recent study on room-descriptions, Ullmer-Ehrich (1981) has shown that the interplay of deictic and intrinsic orientation is much more complex than indicated here and that the choice between them is governed by numerous factors.

5. Cultural origo (non-deictic origo II): The deictic system of reference with an unmarked origo is extremely flexible and dynamic. Anybody who has eyes and ears can determine the basic reference point, but it is not stable. It allows no situation-independent referent, no comparison over time, since it changes in time. There are also difficulties when production and comprehension do not collapse into one situation, for example, in written text.

The alternative is an orientation system whose origo is completely independent of the speaker's position. Host languages have developed devices to express this kind of reference. For example, the calendar system for temporal reference or the thumb-system for local reference. These systems and their zero points, their "origins," have to be stored in the world knowledge of their users. They are specific not to certain languages, but to certain cultures; hence, we may speak of "cultural orientation systems" and "cultural origins." Thus, in Western culture, the cultural origo for temporal reference is the birth of Christ, and the cultural origo for local reference is the intersection point of longitude 0 and latitude 0 . In practical application, these systems may be simplified again. For example, if the speaker is entitled to assume that the listener knows where Eden is, he may successfully refer to a place by "east of Eden" rather than using its coordinates.

With the last two examples, we have left the domain of deixis proper. Whereas case (4) may still be viewed as a case of "frozen" deictic origo, case (5) is completely in-dependent of the speech-situation itself.

Delimitation Principles

If we assume that the linguistic meaning of "here" is approximately "subspace including the origo," it is complete-ly left open how far this subspace reaches. This indeed corresponds to the use of "here;" it may refer to the imme-diate environment of the speaker (in case of unmarked origo), or to the whole world. This openness was first noted in Schegloff (1972). It raises the following problem: What kind of information makes the borders sufficiently clear in a given instance of "here" (or some other deictic expres-sion)?

Basically, there are two possibilities. First, addi-tional specifying expression may be added; for example "It is too hot here" may be specified by "It is too hot here in hell." Second, the job may be done by contextual information. Obviously, we must employ some "delimitation principles," since typically the delimitation is sufficiently clear even if there is no specifying expression. It is not clear exactly what these principles are, but at least two factors are involved:

1. The subspace must be interpretable as a plausible cognitive unit, for example a room, but not a room and one third of an adjacent room—unless this latter subspace is interpretable for some reason as a unit. What counts as a cognitive unit may be very different for different speakers or cultures, but there is little doubt that we all have the concept of such units in our world knowledge.

2. The cognitively interpretable subspaces to be selected in a given utterance depend, to a great extent, on verbal contextual information. In "Close the door, please, it is very cold here," the "here" probably refers to a room, or a part of the room, but not to a country or to the whole earth. In "There is no justice here," the situation is exactly the opposite.

Very often the boundaries are not very sharp. This is particularly true for deictic expressions like "on the left," but it also holds true for words like "here" and "there." This is not a problem specific to local deixis, however. Vagueness is one of the most salient, but also one of the most effective features of natural language.

Lexical Meaning

Deictic expressions usually form small subsystems within the lexical repertoire of a language. Thus, "here" and "there" constitute such a subsystem in English, and so do "left" and "right." Other languages have more elements, such as "hic-istic-illis" in Latin or "hier-da-dort" in German (for a survey of various deictic systems, see Weissenborn and Klein, in press).

The lexical meaning of the different elements within such a subsystem are usually characterized by a number of semantic features. Various proposals have been made in this respect (see Lyons, 1977, ch. 15). The most typical features are based in the distance from the origo. For example, Lyons (1968) uses "proximal" and "remote" to mark the opposition between English "here" and "there." Davis and Saunders (1976) use "proximal-middle-distal" for the Bella Coola system. Other systems also take into account the distance from the listener, or from a third person, or factors such as whether or not the place referred to is in the visual field, independent of its actual distance.

I think this approach of characterizing the lexical meaning of deictic expressions is basically sound and correct. However, it can also lead to difficulties even in the most elementary cases, such as English "here" and "there," whose opposition may be characterized by the feature's "distance from the origo," (or + proximal). The problem is that this feature itself is context-dependent. We can say "Here comes my baby," if the baby is still at a distance of 100 yards, but we also can say "There is my baby," if the baby is at a distance of 10 yards. That is, we would have to assume that the opposition between the lexical meaning of "here" and "there" can be neutralized or even reversed.

An alternative possibility was occasionally mentioned in previous sections. For a given deictic space, "here" always denotes a subspace which includes the origo; nothing is said about the borders of this subspace. "There," on the other hand, denotes some subspace within the complement of the whole deictic space; again, its exact borders are not lexically determined. As a consequence the denotatum of "there" can never include the origo. This accounts for the fact that "there" seems to be more remote from the speaker than "here."

Other, more complex systems may be defined along these lines by including, for example, the position of the listener, by having some features unspecified in respect to these positions, etc. German, for instance, has a tripartite system "hier-da-dort." But these three expressions do not represent three degrees of distance, "proximal-middle-distal," since "da" can replace both "hier" and "dort." A more appropriate description could be: "hier" denotes a subspace which includes the origo, "dort" denotes a subspace from the complement (i.e., it must not contain the origo) and "da" may, but need not, include the origo. This is in full accordance with the fact that "da" is by far the most general deictic term in German.

It is more difficult to characterize the lexical meaning of "left" and "right." The canonical dictionary defini-

[4] It should be noted, however, that there are strong dialect differences in the German deictic system. In my own dialect (Rheinpfälzisch), "hier" simply does not exist.

tion is something like, "related to...the side of the body
in which the heart is mostly located" (following Webster).
This is basically correct, but not fully satisfactory, since
what "left" and "right" refer to may change if we turn our
head. If we turn our head 90 to the right, all that was
previously in front may now be described as on the left.
Hence, it seems more plausible to assume that a speaker's
origo and direction of gaze split his visual field into two
subspaces, one of them including that part of the body in
which the heart is mostly located. This subspace is "left,"
and the other one, "right." This semantic characterization
raises a problem for the space behind the speaker. Indeed,
it seems that for this space "left" and "right" are not
clearly defined. The usual way to overcome this problem is
to imagine that we are looking in the opposite direction,
behind ourselves. As we shall see later, imaginary changes
of origo and direction of gaze are a typical feature of
deixis in route directions.

Analogical Deixis

     If someone points to some spots on a map and says "here
is Lake Michigan, and here is Chicago," he obviously does not
want to say that what he points to is Lake Michigan and
Chicago, but that the targets of his pointing correspond in
some way to certain places, and it is to these places that he
really wants to refer. In this case, two deictic spaces are
involved: the "real" deictic space, and some "analogical"
deictic space — the map. By pointing to an element of the
map, we are referring to a corresponding element of the "real"
space. The association between the two spaces is given by
the cartographic projection. But analogical deixis does not
necessarily require two spaces associated by some mathemati-
cal specification; in many cases, some vague resemblance is
sufficient for a correspondence and hence for analogical
deixis. If somebody points to his right hip and says "The
car hit him here," it is the corresponding body part of some
person that is referred to. In this case, there is an ana-
logue within one deictic space.

     In a similar way, we may indirectly refer to "generic"
places. If a professor of medicine says to his students:
"Take care that the needle is put exactly here," pointing to
some spot of his glutaeus maximus, he does not really refer

to that part of his glutaeus maximus nor to the corresponding
part of some other specific person, but to the "generic" part
of the glutaei maximi, of which he used his own as a token.

What I have briefly sketched so far are the indispen-
sable ingredients of local deixis in everyday use. It is
remarkable how well people succeed in organizing them. As
a rule, we have no problem with successful identification of
local denotata, although this involves a complex integration
of expression information with the whole of contextual infor-
mation. The ways in which deictic spaces are set up or in
which possible subspaces are delimited are multivarious, but
not idiosyncratic. So long as the contrary is not indicated,
a speaker is entitled to assume that the listener knows the
language and thus the lexical meaning of deictic expressions,
that he knows to integrate expression and contextual infor-
mation, and that he has eyes and thus can identify the origo.

In the following sections, we shall consider some cases
in which the deictic system is operative and of major impor-
tance for the verbal task to be solved: local deixis in
route directions.

A route communication refers to the complex verbal
action of asking for and giving route directions. The
starting point of a route communication is the fact that a
person, Q, has an incomplete representation of some deictic
space of a local environment, whereas another person, A, has
a more complete representation, and their job is to elaborate
on Q's representation. It cannot be said that nothing is
shared in the deictic space involved, because Q has eyes and
perhaps some knowledge, but it is not fully shared knowledge.

The first study I want to speak about is based on 2 x
20 real route communications. They were collected in th
inner city of Frankfurt/Main (Figure 1).[5,6] At the upper Zeil,
Frankfurt's main shopping street, or at the Hauptwache (a
small building of the 18th century) people were asked either
for the "Alte Oper" or the "Goethehaus," both well-known

[5]A more detailed report of this investigation is given
in Klein (1979).
[6]I am very grateful to Elke Habicht, Michael Kahn, and
Christa Reinhardt who did an excellent job in playing tour-
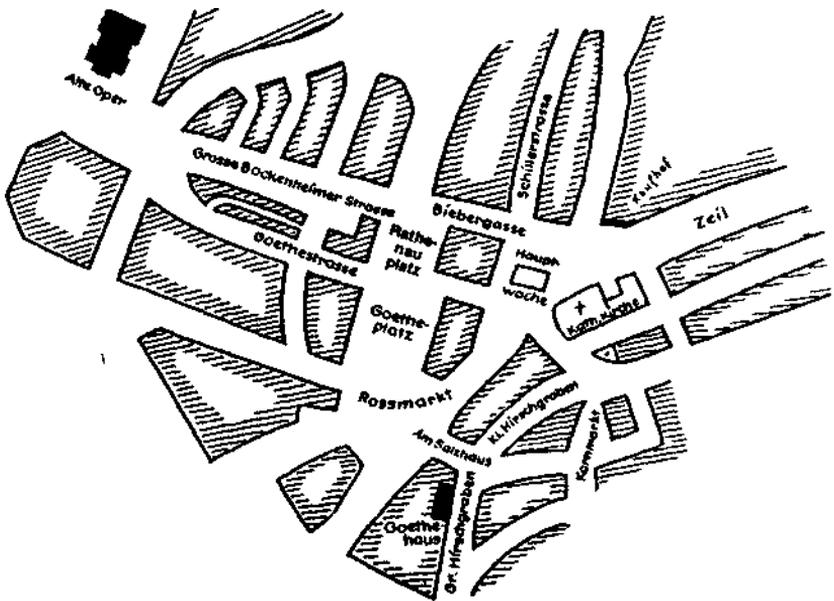ists who got lost.

Figure 1. Frankfurt (inner city). (Simplified map)

landmarks in Frankfurt. The whole action was covertly tape-
recorded. More than 100 route communications were recorded,
some of them very noisy because of the traffic. The first 20
from each group (Alte Oper, Goethehaus), if fully understand-
able, were selected and transcribed for further analysis;
they are labelled as 01-020 and G1-G20. The transcription is
in standard orthography, with some slight touches of dialec-
tal pronunciation for some speakers. Pauses and parallel
speaking were transcribed as accurately as possible. Some-
times, more than one person answered; in this case indices
are used: A_1, A_2, etc.

     There is a clear interactive scheme of successful route
communication. In the first part, Q is dominant from an in-
teractive point of view: he has to get into contact with A,
to make clear what he wants and to convince A to assume the
task of giving directions. In the central part, it's A's
job to describe the way (route directions proper) and to
make sure that Q gets the message. In the last part, Q dom-
inates again: he has to attest to A that his job is done,
to acknowledge and to end the contact. All parts are inter-
esting from an interactive, a cognitive, and a linguistic
point of view. But in what follows, I shall only be con-
cerned with some aspects of the middle part, the route di-
rections proper.

                    Planning the Directions

     In order to describe the way, A has to have some cog-
nitive representation of the area in question, to select
and to linearize some pieces of information which he takes
from his cognitive representation, and to express these
pieces of information with the aid of motion verbs, deictic
expression, etc.

     In this section, I shall briefly deal with the first
two aspects. The speaker's knowledge of the area in ques-
tion usually goes back to his own previous experiences: he
remembers what he has seen and heard as he walked through
the streets, how he turned left and right, and how the street-
car moved. All these impressions and sensations must be
organized into a "cognitive map." There is a vast amount
of research on this concept, and I won't discuss it here.
(See, for a recent survey, Downs & Stea, 1977). There is
indeed one point which is rarely mentioned in the literature
but which plays an important role in route directions:

whatever our spatial knowledge of an area might be and how-
ever it might be structured, it is usually not present or at
least not fully present. We activate it on occasion.

In the case of route directions, A's cognitive map of
the area in question is activated by Q's request. A then has
to localize his actual position—the starting point of the
route direction—and the destination on his map. Such an
activated part of the whole cognitive map with a localized
starting point and a localized destination point I will call
the "primary plan" of the whole route direction.

Building up this primary plan may be done immediately
after Q's initial request, or stepwise. The following simple
description is a case of advance planning (G-2):

    Q   Zum alten Opernhaus?
    A   Ja?   jaa (10 sec) da gehen Sie jetzt bis
    Q   ja   oben drüber, ja
    A   zur Zeil,   oben drüber, nicht unten durch oben
        drüber
    Q
    A   gehen durch die Goethestraße durch, und dann kommen
        Sie direkt an die
    Q   dankeschön
    A   alte Oper   bitte, Wiedersehen.

It is clear from the whole situation that Q wants to
ask for something; A first signalizes his readiness to enter
the interaction (ja?). Q then specifies the goal "zum alten
Opernhaus," omitting the obvious sequence "could you tell me
how to get...." (or something similar). A then indicates
that he is ready and competent to fulfill the request ad-
dressed to him by a very long "jaa;" he then makes a long
planning pause. After that, he is able to perform his de-
scription in one stroke, interrupted only by feedback con-
trol and confirmation. When he starts, he obviously has a
sufficiently clear primary plan. He is an "advance planner."
The following text is an instance of "stepwise planning"
(0-17):

    Q   Entschuldigen sie, können Sie mir sagen, wie man zur
        alten Oper
    A
    Q   kommt?
    A   na, oh ja doch, (2 sec) Sie können (2 sec) hier rauf

```
Q    jaha
A  (2 sec) bis (6 sec) ehm, ich muss auch erst überlegen
   well's
Q
A  son bissel verbaut wurde; (4 sec) Sie gehn jetzt
   hier eh zur Ecke
Q
A  dann links oben über den Platz, dann gehn Sie gera-
   deaus, das
Q    ja
A  1st die Goethestrasse also nicht diese, sondern die
   nächste dann
Q    mhm
A  rauf, und dann stossen Sie direkt    das ist dann
   auf der rech—
Q    mhm      gut,
A  ten Seite das 1st dann die alte Oper das sehen
   Sie schon;
Q  dankeschön
A    bitte.
```

Here too, A first signals his readiness and willingness, but
he obviously starts talking before he has activated the
necessary pieces of his cognitive map; this is clearly indi-
cated by a series of pauses, ending with a statement that,
first, he has to think again. After the four-second pause,
his plan is clear, and he is able to linearize and to express
the necessary information.

     In longer and more complex route directions, there are
often several interruptions of this sort -- that is, after A
has reached in his imagination some point, he has to "visual-
ize" the environment at that point, and only then is he able
to continue his description. Activating the entire necessary
part of the cognitive map in advance or step by step are com-
plementary techniques, and it is an open question whether
they correspond to individual cognitive styles or whether
their use simply depends on the complexity of the task.
Short routes may allow advance planning; complex routes may
require stepwise planning.

     Building up a primary plan, whether in advance or step-
wise, is a first prerequisite for successful directions. But
all the information contained in the primary plan is not ex-
pressed, of course, since most of it is superfluous for the
purpose of the required route directions. The speaker then

has to select and to order those bits ana pieces he considers indispensable to the listener. We may say he has built up a "secondary plan;" this plan then underlies the linear sequence of expressions that constitutes his route description. The organizing principle of this secondary plan is that of an "imaginary tour" from the starting point to the destination.' In the course of this imaginary tour, certain salient points of the primary plan are selected, and this series of "fixed points" constitutes the backbone of the description. The directions themselves then have three descriptive components; fixed points must be introduced, directions relative to these fixed points are marked, and actions or events are indicated. This information is given by three kinds of descriptive expressions: expressions that introduce fixed points, deictic expressions which relate actions to these fixed points, and expressions for these actions or events themselves, that is, expressions that describe what happens at the given point or prescribe what Q has to do there.[8] Consider the following passage from 0-1:

> A.   hier vor bis zum Kaufhof; rechts ist der Kaufhof,
>   ja? und da halten Sie sich rechts . . . .

    The first fixed point is the starting point, introduced by "hier;"* relative to this point, the action to be performed is indicated: "go on to the Kaufhof;" this next fixed point Kaufhof is then introduced by "it is to the right;" then, a new position relative to that fixed point is introduced ; "da" (=at the Kaufhof), and the next action is prescribed:

        The concept of an "imaginary tour" as a linearization principle was first introduced in Linde and Labov (1975) in their study of apartment descriptions. Cf. also Ullmer-Ehrich's (1981) concept of "gaze tour" and the linearization strategies studied in Levelt (1981). It seems to me that all these principles can be traced back to the attempt to introduce a "temporal" order into multidimensional complex information. In route directions, the obvious way to introduce such a temporal order is to imagine the series of actions to be performed.

        There are various other kinds of expressions to be found in route directions, for example "feedback" signals, confirmation, comments on the difficulty of the route, etc. They will not be considered here; for a more extensive discussion, see Klein (1979).

"keep to the right," and this is continued until the desti-
nation is reached.

   The use of deictic expressions. Let me turn now, after
these very sketchy remarks on planning, to the third task of
A, the expression of those pieces of information he thinks
to be relevant. As we have seen already, deictic expressions
play a crucial role in this process. Their use is marked by
two characteristics:

      1. Between A and Q, there is an asymmetry concerning
the deictic space. A is assumed to know more about it than
Q, and just this asymmetry is the starting point of the
whole route communication. This does not mean, of course,
that their deictic spaces are completely different; they
share, for example, its perceivable part, but this is not
sufficient. So, deictic reference aims at denotata which in
a sense are not in the referential domain of Q at the time
of utterance. Thus, A has to provide Q with some additional
elements of the deictic space, and it is this which is done
by introducing fixed points and giving additional information.

      2. To begin with, the origo is the position of the
speaker, that is, the unmarked origo. But as the description
goes on, the origo is constantly shifted, although both
speaker and listener more or less keep their position; but
the basic reference point of all deictic terms is the imagi-
nary position of the walker on his imaginary tour; this also
concerns the imaginary direction of gaze.

      The lexical meaning of deictic expressions is the un-
usual one. The delimitation is generally based on world
knowledge (cf. section on origo above). Analogical deixis
almost never occurs in the data studied here, although it
might well occur in route directions, for example when maps
or simple drawings are used. So, we will focus on the two
components mentioned above: incomplete deictic space, and
moving origo.

      The deictic space of the listener has to be completed
by certain selected "fixed points" — streets, places, build-
ings, in general, by "landmarks" (Lynch, 1960) of various
kinds. This is done in four ways:

      1. By "visual" introduction, that is, by gestures point-
ing to, or just by looking at, landmarks that are in the space

über den Bauplatz, wo Akai draufsteht, dort oben, und da..."
(here across the building-site, where the Akai-sign is at the
top, and there . . .) : both speaker and listener are looking
toward the same direction, and the speaker is entitled to
assume that the listener can identify the Akai-sign and hence
the fixed point.

2. By non-deictic descriptions, for example, in G-16:
"un wenn Sie Stück drin sin, wo die Leute da sitze, ..."
(and as you have walked some steps into it, where people are
sitting, ..,)

3. By relating the fixed point to be introduced deictic-
ally to the previous fixed point; this is systematically done
with the aid of expressions like "the first ... after ...,"
"the next ... after ...." This technique is particularly
frequent, and there are even some cases in which it is used
exclusively. The first fixed point is the starting point,
and all others are related to it by deictic expressions.

4. By treating it as an implicit result of the previous-
ly described action or event, e.g., 0-18: "Da vorne durch
und rechts." "Rechts" is relative to a point which will be
reached after the action indicated by "da vorne durch" will
have been completely performed.

In most cases these techniques are used in combination. In
what follows, I shall consider one example in more detail
(from 0-4). Q's reactions are omitted; the fixed points are
underlined:

A: <u>Jetzt</u> gehn Sie vor, bis ganz vorn him, bis Sie and den
   <u>Kaufhof</u> stoßen, dann gehn Sie links rein, die <u>Bieber-</u>
   <u>gasse</u>, also Sie gehn <u>hier</u> vor und halten sich dann ganz
   links, dann kommt die <u>Schillerstrasse</u>, die überqueren
   Sie, da is vorn an der Ecke is eine <u>Herrenboutique</u>,
   da gehn Sie dran vorbei; da gehn Sie ganz gerade durch,
   da kommen Sie auf die <u>Goethe</u>-, auf den Rathenauplatz,
   den überqueren Sie auch, also Sie können gar net
   fel; gehen, dann sind Sie an der <u>Grosse Bockenheimer</u>
   <u>Strasse</u>, und wo die Grosse Bockenheimer Strasse aufhört,
   da liegt rechts das alte Opernhaus.

The various fixed points are spatial units, and the re-
lations between them are spatial, too. Hence, the appropriate

verbal means of referring to them and of interrelating them
should be spatial expressions, in particular terms of local
deixis. Indeed, they mostly are. But the order in which
the fixed points are presented is defined by an imaginary
tour, that is, by a temporal sequence of actions or events.
This particular structure which the speaker imposes upon his
description allows him to use temporal deixis as well: there
is a <u>first</u> action to be performed at the starting point, and
a series of follow-up actions (or events) which then may
function as reference points for other action or for the
introduction of fixed points. This alternative is regularly
used by most speakers, although local terms are still domi-
nant.

      The first fixed point is defined by the actual position;
in most cases, it is referred to by "hier."[9] But in the de-
scription above, A chooses the temporal option: he starts his
directions with "jetzt." This "jetzt," of course, does not
refer to the time of utterance, or some time interval contain-
ing this "temporal origo." It refers to the event time of
the first action in a series of imaginary actions — that one
which is to be performed at the starting point (in this case
the south-east corner of the Hauptwache; cf. Figure 1).

      The next fixed point is introduced twice; first, as a
result of an action ("hingehen") together with an adverbial
with a deictic component ("ganz vorn"), and then — perhaps
because "ganz vorn" is not very clear — by a visually identi-
fiable object to which the action will lead: the Kaufhof —
a big department store which is easily identifiable from the
speaker's and listener's position. Fixed point 3, the Bie-
bergasse, is again first introduced as the result of an ac-
tion: the result of turning and going to the left at fixed
point 2; this fixed point is then explicitly named. The term
"links" is defined in relation to the expectable imaginary
position and direction of gaze of the imaginary wanderer at
fixed point 2. In another route direction (0-2), the same

      [9]I am considering expressions like "the first ... after,"
"the next ... after" as deictic terms since, in this context,
they always relate to a fixed point in a series which begins
with the <u>hic et nunc</u>. But this does not mean that "first,"
"next," "last," etc. are deictic in general; they are always
relative to other items in a series, but they need not be
rooted in the speech act.

street — Biebergasse — is referred to as "to the right" — at the same position — standing in front of the Kaufhof; but in this case, the starting point was the Zeil, and hence, the expectable direction of gaze at the Kaufhof is such that the Biebergasse is (slightly) to the right. It is perhaps too deep an insight that the same place may be both left and right in relation to another place, but these two examples illustrate a general principle which partially determines the use of deictic terms in route directions: what they refer to depends on an _imaginary_ position, and on _imaginary_ directions of gaze; both are strongly underspecified; but the quite real-istic possibility that the real wanderer would stay somewhere, turn around, make a detour, enter a shop, etc. is never taken into account; but speaker and listener can rely on what might be called "normal and expectable course of events and ac-tions," and our estimations of what is normal and expectable again are part of our world knowledge.

After having reached the Biebergasse in his mental wan-dering, A in 0-4 jumps back to the starting point and partly repeats what he has said before ("also Sie gehen hier vor und halten sich dann ganz links"). He then introduces the next fixed point ("Schillerstrasse"), using the deictic verb "kommen" with the place in subject position ("dann kommt die Schillerstrasse"), just as if the Schillerstrasse would move to the position of the wanderer. Fixed point 5, the Herren-boutique, is explicitly introduced by a non-deictic descrip-tion. In contrast to the first use of "vorn" in introducing fixed point 2 ("ganz vorn," see above), where it is related to the endpoint of the forward movement, "vorne" in describ-ing the location of the Herrenboutique is related to the in-trinsic orientation of the whole block: "vorn an der Ecke." The next fixed point is left implicit: the position the wanderer will have reached after having passed the Herren-boutique. Actually, this fixed point is the Biebergasse, introduced as such in the first "run" of his description. For the next two fixed points, Rathenauplatz and Grosse Bockenheimer Strasse, A again uses the technique "result of action and naming." The last fixed point, the destination, is introduced by a combination of descriptive expressions ("wo die Grosse Bockenheimer Strasse aufhört") and deictic terms ("da liegt rechts....").[10]

[10]Actually, "aufhört" clearly has a deictic component; if the imaginary wanderer would come from the other side, the street would _begin_ exactly there.

A in 0-4 has a strong preference for "result of action" characterization which is not shared by all informants. But his description clearly exhibits two features which are most typical: the intricate integration of all four devices, on the one hand, and the permanent reliance on what would be the normal and expectable — the "unmarked" — course of events and actions, on the other. Both features are immediately relevant to the specific use of deictic terms in route directions. First, there is no stable deictic space, no given referential domain shared by speaker and listener. In order to apply deictic terms, the speaker first has to complete in part the listener's deictic space. With any fixed point element introduced there, he is able to use it as reference point for deictic terms, which then in turn may serve to prescribe actions or to introduce new fixed points. Similarly, the actions he prescribes or the events he predicts are often used simultaneously to complete the deictic space or to supply new reference points for deictic terms. The combination of these different functions results in a dense and compact verbal structure of which 0-4 is not atypical. Second, the origo in route directions undergoes a constant imaginary shift. Speaker and — if the route directions are successful — listener imagine moving their positions and their directions of gaze. But the explicit statements about this permanent change of orientation are restricted to a few indications, and a great deal is left to common assumptions of what is normal and of what can be expected by a normal participant in communication.

Route Directions of Children

Giving route directions involves the integration of various types of knowledge and abilities; more specifically, A must have a cognitive representation of the area in question, must be able to localize starting point and destination, must be able to linearize the information to be transmitted by an imaginary tour, and must be able to apply the relevant verbal expressions, especially local deictics.

In the remainder of this paper, I shall report some findings on how children learn to master this complex verbal action. The results are from a recent study by Jürgen Weissenborn (1980) of our research group. His study is much in the spirit of the research discussed above, although the data were collected in a semi-experimental way, basically a hide-and-seek game. A child A, familiar with the local environment, was asked to describe to a non-resident child Q of about

the same age how to find a hidden toy. The children were
A, 6, 8, and 10 years old, each group consisting of 6 pairs;
child A and child Q of each pair did not know each other un-
til immediately before the experiment.

     The local environment was a small German village and
care was taken that the resident child was really familiar
with it whereas the non-resident child was not. In a first
run, child A went together with the experimenter from S_1 to
G_1, hid a bag of toys there, went back the same route to S_1
and then instructed Q on how to go. The second run was basi-
cally identical, except that the way from S_2 to G_2 was much
more complex and there was an easier way which was largely
identical to the route of the first run; the distance in
both cases was about 300 m. The route communication at S_1
and S_2 were videotaped and transcribed. The basic findings
of the analysis are as follows.

     1. Children of age 4 only give the approximate area of
the goal; no attempt is made to describe the route, even if
the other child obviously doesn't understand where to go.
If, however, the whole route is elicited step by step by the
experimenter, these children are able to reconstruct the
whole route, to describe intermediate landmarks and the action
to be performed there. In other words: children of age 4
are able to represent the necessary spatial knowledge, but
they are unable to communicate it, since they do not master
the strategy of imaginary wandering. Their failure is not a
problem of spatial knowledge but of complex language produc-
tion for which they lack the underlying linearization strategy.

     2. A second group of children (all 6-years-old, some of
the 8-year-olds) is able to introduce a connection between
what is visible from the starting point, but their descrip-
tion becomes dysfunctional: they either do not introduce in-
termediate fixed points, or they introduce them as if they
were visible. In other words: they have the necessary spa-
tial knowledge, they apply the strategy of imaginary wander-
ing, but they are wandering in their own space: they do not
take into account the fact that the listener cannot "see"
what they "see" when remembering the route.

     3. A third group (remaining 8-year-olds, all 10-year-
olds) finally is able to give fully adequate descriptions
and some members of this group are able to optimize the
route by prior knowledge: they do not give the route they

travelled when the toy was hidden but the much easier route known from the first route. It should be noted that even this group has some problems with left and right, but they are able to manage them by using other verbal means.

I have mentioned here only some results of this study, but they clearly indicate that the missing competence of children to express spatial orientation has not so much to do with spatial knowledge itself, which seems to be available to all children in this study, but with (a) the lack of strategies of verbal planning, (b) an inability to manipulate some deictic expressions, and (c) the inability to check their own knowledge against the listener's knowledge of the deictic space in question and to elaborate on the listener's deictic space as soon as it becomes necessary.

This last point might easily be interpreted in terms of the child's egocentrism, but it also links the successful use of deictic terms to more interactive aspects of language use. Just as successful communication is general, successful application of deictic expressions requires constant monitoring of the contextual information available to the listener. In this respect, another observation is most pertinent: all children from group 2 on behave as if they would take into account the" listener's knowledge; they regularly use the corresponding interactive signals — for example "wa?", "ne?", etc. — but they do not care how the listener really reacts; whether he confirms or disconfirms, they go their way. This seems to show that the use of interactive signals precedes their functional application.[11]

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