

Chapter 13

The Nijmegen Space Games: Studying the Interrelationship between Language, Culture and Cognition

Gunter Senft.

Alles ist Spiel.

J. Huizinga *Homo Ludens*, p. 230

1 Aims of the Nijmegen 'Space Project'¹

The Cognitive Anthropology Research Group (since 1998 the 'Department of Language and Cognition of the MPI for Psycholinguistics'), which started its research in 1991, tries to bring the Cognitive Sciences - especially Psychology and Linguistics - into dialogue with Cultural Anthropology - especially Cognitive and Linguistic Anthropology.

The central aim of the group is to conduct further research into the relationships between culture and cognition by conducting fieldwork on leading issues of common interest to anthropology, psychology and linguistics (see also Levinson 1992, 1996a&b; Senft 1994a, 2001). We try to investigate interdependencies between language, culture and cognition empirically via the following stratagem (Brown and Levinson 1993: 1):

- (a) first, pick a conceptual domain;
- (b) second, find two or more languages which contrast in the semantic treatment of that domain (i.e., where very different semantic parameters are employed);
- (c) third, develop non-linguistic tasks which will behaviourally reveal the conceptual parameters utilised to solve them;
- (d) compare the linguistic and non-linguistic representation systems as revealed by (b) and (c), and assess whether there is any correlation between linguistic and non-linguistic codings in the same domain.

The (first) conceptual domain we have 'picked' is the domain of 'space'. Thus, our initial major goal of research was to investigate the conceptualization of space and spatial reference in a cross-cultural/cross-linguistic perspective (see Pederson et al. 1998).

2 Methods to Elicit Verbal Reference to Space

To do this, we had to develop methods to build a comparative data base through parallel field research in different languages and cultures. This data base should serve us as a kind of 'natural laboratory' for testing and revising theories in psychology and theoretical linguistics. For the purposes pursued here I will describe only some of the many methods we developed for data elicitation (see Senft 1994a). All these methods make use of various sets of interactive 'games' which are used to elicit task-oriented verbal descriptions in native speakers of the language under study. Most of these tasks involve the recognition or the construction of spatial arrays from systematic sets of two- or three-dimensional stimuli (see Senft 2001: 522ff.).

The interactional games for focused linguistic elicitation were especially developed for our research purposes² (see also Hill 1993). They all involve a 'director' consultant who is allowed to see a certain stimulus, and a 'matcher' who is not. The players are sitting side by side with a screen separating them so that they cannot see each other's stimuli. The orientation of the players is taken note of, and the field researcher instructs the players what to do in their own language - all instructions are standardized. Moreover, the field researcher encourages the players to interact verbally, especially if they think they have difficulties in understanding each other. On the basis of the verbal descriptions given by the 'director' in the game, the 'matcher' is asked to reproduce three-dimensional models involving familiar objects with intrinsic orientations, like a human statuette in various body poses and mini-landscapes inhabited by model farm animals, as well as unfamiliar and abstract

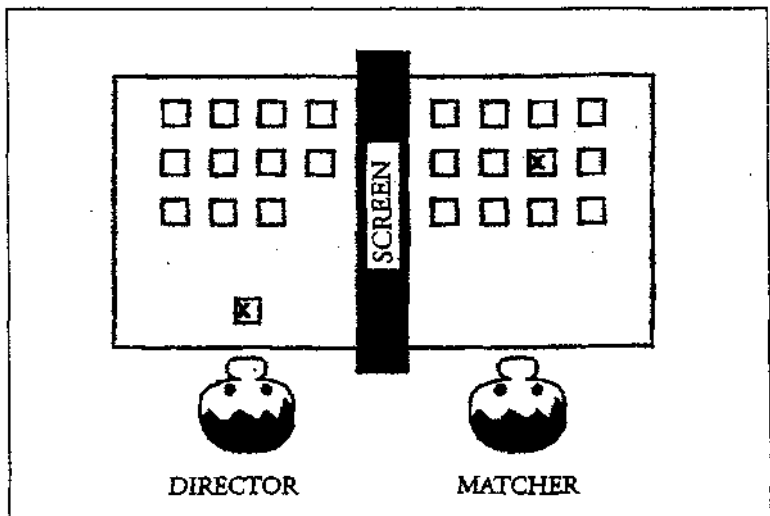


Figure 13.1: Diagram showing set-up of game.

objects. Some games also involve the matching of photographs on the basis of verbal descriptions; these photographs systematically cover certain spatial oppositions. All games are played at least three times with two consultants in two runs each. In the second run the matcher of the first run takes over the role of the director, and the director of the first run becomes the matcher. Figure 13.1 illustrates the basic idea of these games.

In what follows I will describe a selection of these interactional games.

The 'photo-object game' is played with three-dimensional plastic toys and photos depicting a certain spatial configuration of these toys. The director describes the photo, and on the basis of this description the matcher uses the toys to rearrange the spatial configuration. Figure 13.2 presents an example of such an arrangement.

The 'wooden-man game' requires that the director, on the basis of photos or on the basis of a wooden human statuette with flexible angles, describes certain body poses. The matcher has to adjust his or her statuette in such a way that the resulting body pose matches the description. Figure 13.3 presents an example of such a bodypose.

In the 'Tinkertoy games' the matcher - with the help of a building system for children - has to build a number of three-dimensional configurational and nonconfigurational constructions on the basis of the director's description which itself is based either on the same object or on a photo of the object to be constructed (see Senft 1994b). We built eight representational and nonrepresentational constructions. Each has different advantages. Representational constructions give a clear goal in construction and speakers may have already available (body-) part terms for reference. This should make it easier for most people. However, both constructions are fairly complex. Nonrepresentational constructions are more likely to make the informants rely on 'abstract' descriptions which may involve, for example, angles, planes, etc. This task is obviously an

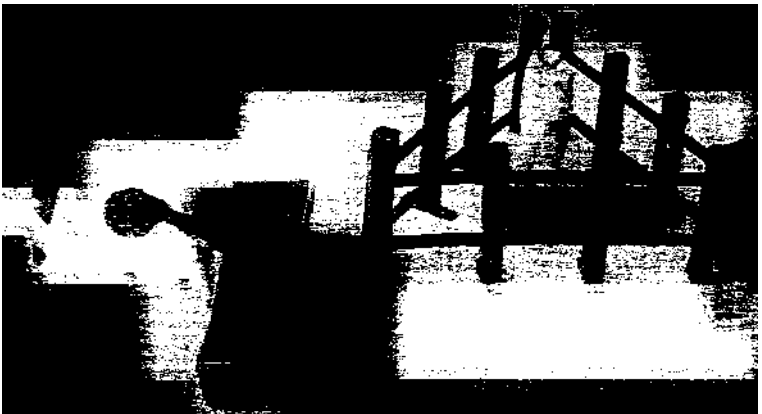


Figure 13.2. Photo-object game.

'unnatural' task and may be quite challenging for many speakers. Figure 13.4 presents an example of a nonrepresentational Tinkertoy construction.

The 'photo-photo game' (also called 'men-and-tree game') consists of four series of 2 x 12 photographs; here the matcher has to select one photo on the basis of the director's description (see Pederson et al. 1998). The photos depict certain localizations and configurations of objects with and without intrinsic features in four directions on the horizontal plane (see Pederson 1993). Moreover, the set contains a number of distractor photos, so that it did not become too obvious to the players to hypothesize about what we were after with the game.

The two sets of 12 photos are each shuffled before the game is played, then they are laid out in front of each player, in a grid. Thus, the photographs in front of the two players are randomly ordered - on each side of the screen. After this the director is asked to pick a photo and to

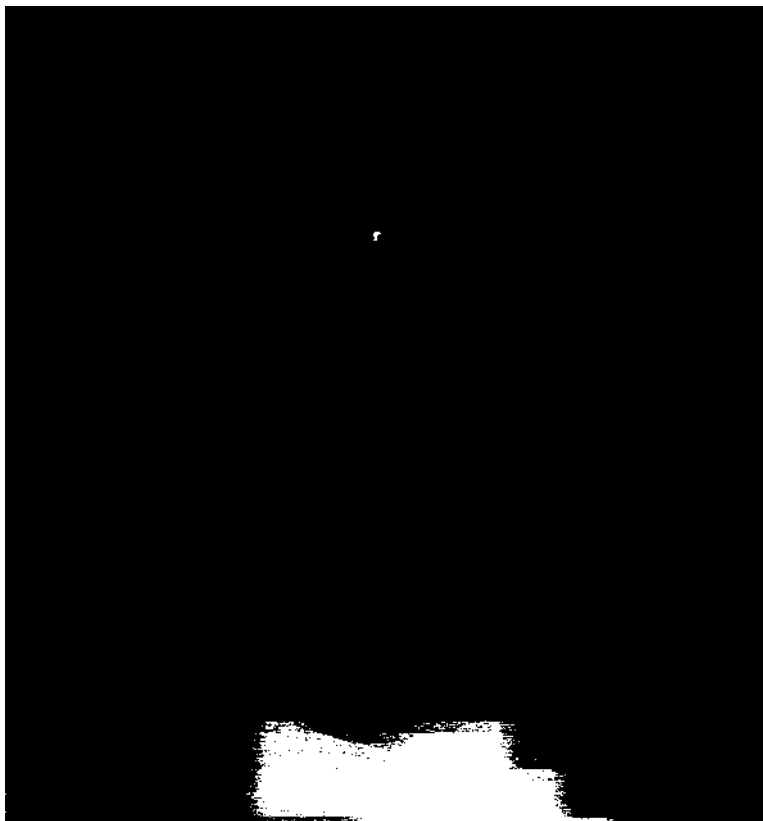


Figure 13.3: Wooden-man game.

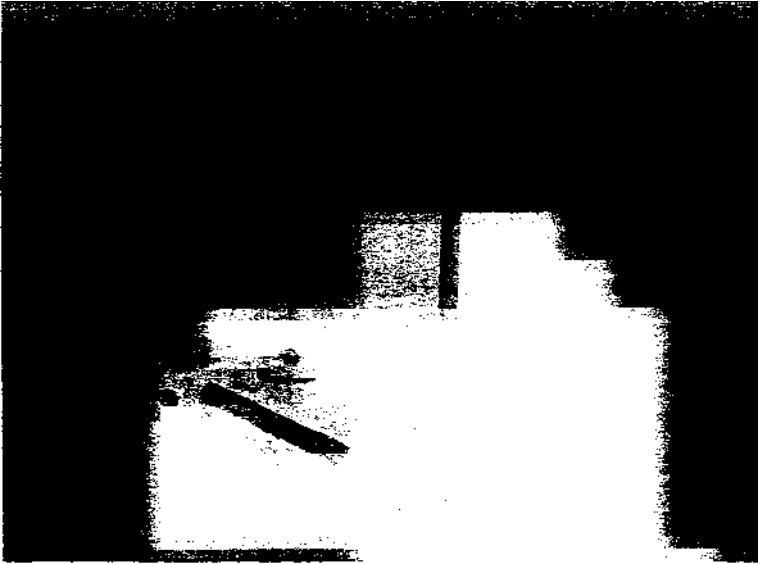


Figure 13.4: Tinkertoy games.

describe it. Both players are encouraged to interact verbally, if they **are** having problems with the matching task. If the matcher thinks s/he has found the photo described by the director, the players are asked to pick up the photo from their grid and to put it upside down on a pile beside this grid. After the game, i.e. when all 12 photos have been described, the piles are compared with each other and mismatches are discussed with the players. The games should be at least tape-recorded; ideally they should be filmed as well.

The first set of photographs is a training set that should make the consultants familiar with the basic idea behind the matching task.

The second set was developed to elicit spatial reference to relationships in the horizontal plane between two unfeatured objects (balls) and between a featured (man) and a nonfeatured (tree) object.

The third set was developed to elicit spatial reference to relationships in the horizontal plane between two men (featured objects) presented in same orientation, i.e., the two men are always looking in the same direction.

The fourth set was developed to elicit spatial reference to relationships in the horizontal plane between two men presented in different orientation, i.e. the two men are oriented in opposite directions.

Figure 13.5 presents a picture from this last set and figure 13.6 presents drawings of certain 'Man and Tree' configurations from the second set of photographs.

We also developed games to elicit the description of motion events and thus certain notions of motion. They consist of a route direction game and film description tasks.

in the 'route-description game'¹³ the director and matcher play with two dolls and two identical 'stylized' landscapes in front of them (see Senft 2000). These landscapes are organized symmetrically around a central axis, with objects on each side of the central axis being of identical shape and colour. This symmetry within the base design should force the consultants to differentiate directions in the cross-axis (the so-called left-right axis). Three pairs of different objects - in the foreground two roof shapes on each side, in the middle ground two simple bridges on each side, and in the back two towers on each side - form the constant objects of the basic scene. Other objects that are symmetrical in one axis - two short fence rails, a truck, a Duplo stair structure, and a rectangular fence structure - can be placed with their axis of symmetry along the central axis. Thus, one way of varying scenes in the landscapes in which routes have to be described is by placing this limited number of symmetrical objects along the axis of symmetry. All these objects were selected to elicit certain notions of motion like 'going around, circling, going through, going along, going over/under, going up/down, passing through/under, moving to the back/front of, moving on the left/right side of, climbing over etc. (for a more detailed description see Danziger 1993: 15-28). There are four basic scenes to be elicited in the route description elicitation task. Mixed in with these are three distinct conditions:

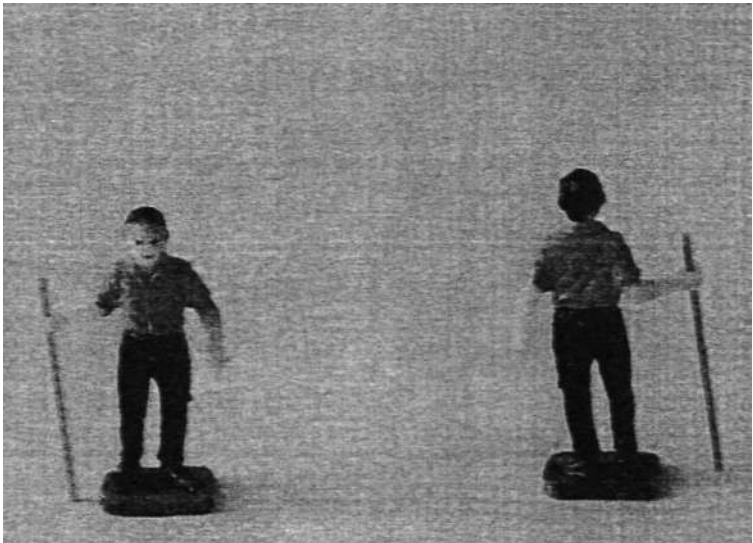


Figure 13.5: 'Man and tree' photographs.

The first condition is one of pure symmetry in the scenes and applies to the first two routes (see Figures 13.7 and 13.8). The first path starts off to the left and never moves back towards the speaker, but finishes at the other end of the table on the far yellow square. The second path moves off to the right and is a long return path back to the starting point.

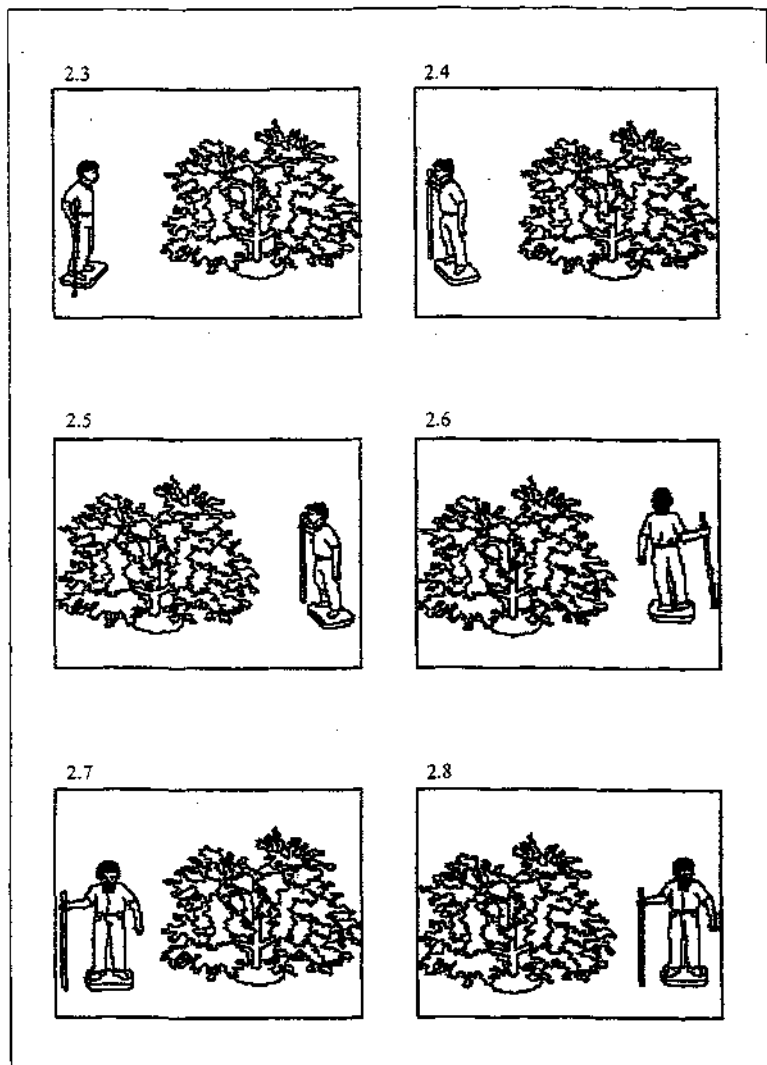


Figure 13.6: Drawings of 'Man and tree' photographs.

The second condition applies to the third route. Here the researcher is to use the open spaces in the design to place (e.g. local) objects which destroy symmetry. The only constraint is that these objects do not block the route that is to be described (see Figure 13.9). The point of this condition is to see whether the new objects in the scenes are taken up as landmarks which resolve any of the original problems which may have arisen in the symmetrical condition.

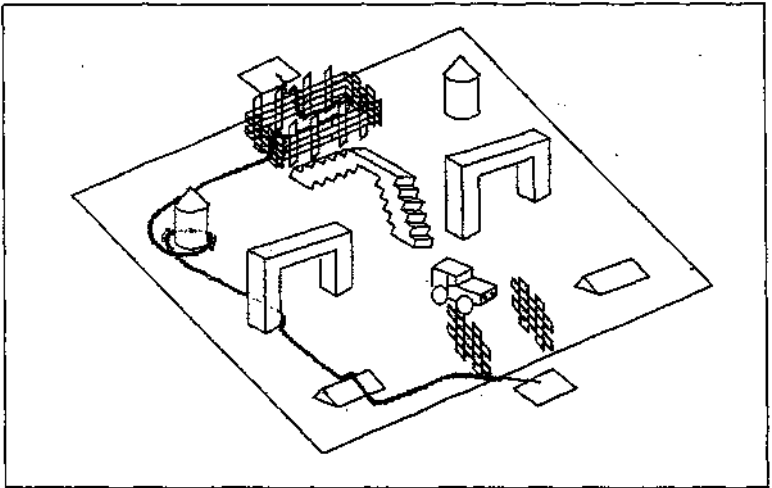


Figure 13.7: Path 1 (set-up for director).

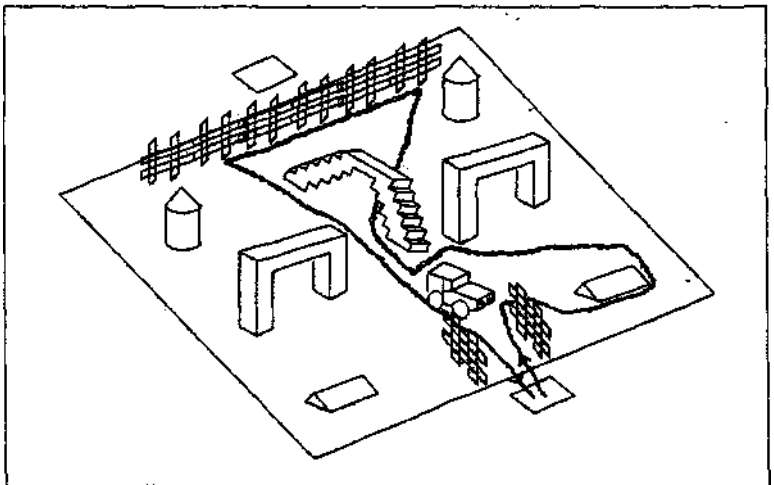


Figure 13.8: Path 2 (set-up for director).

The third condition applies to the fourth route (see Figure 13.10). On either side of the mat, the researcher has to place relatively large objects that are not to be construed as part of the scene itself (like, e.g., a coconut or an apple to the left of each mat and a bush knife or a bowl to the right). The point of this condition is to see whether ad hoc local landmarks - basically outside the scene - will be used to facilitate the route description.

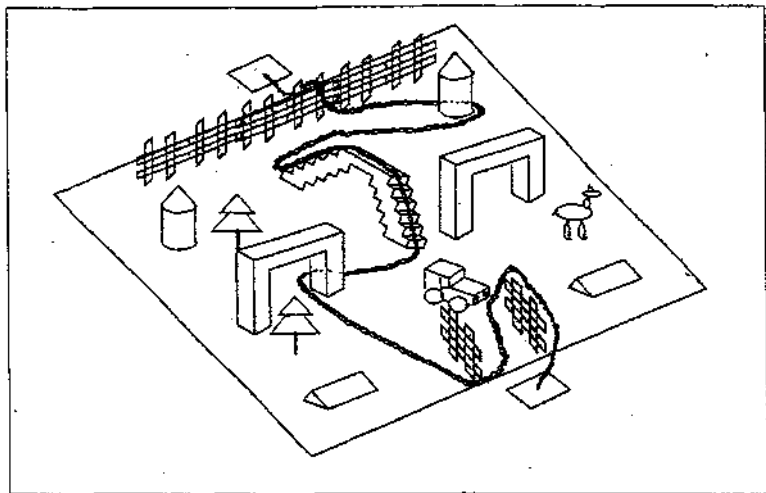


Figure 13.9: Path 3 (set-up for director).

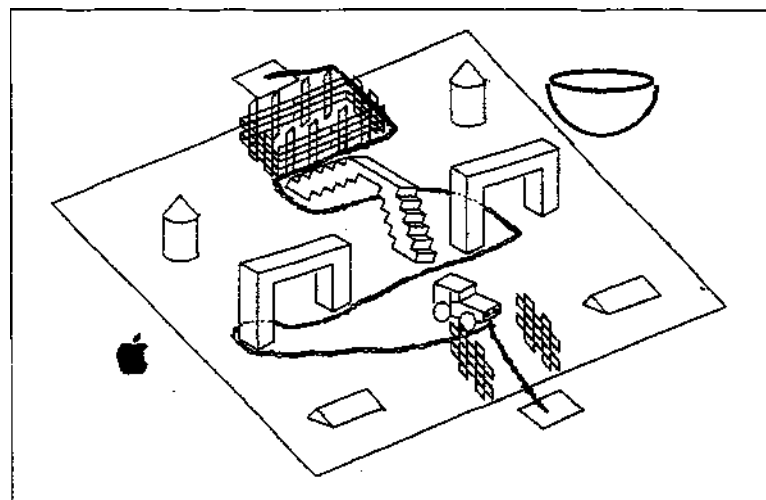


Figure 13.10: Path 4 (set-up for director).

The director is asked to let his/her doll 'walk' and describe a route that is indicated by a small chain on his or her landscape so that the matcher can let a small doll 'walk' this route on his or her landscape, (see Weissenborn 1986; Wilkins and Hill 1995; Senft 2000).

'Staged events' is a data elicitation tool which combines research interests in serial verb constructions, in event typicality, and in event complexity (see van Staden et al.2001). It is designed to collect descriptions of complex events in order to examine how these are segmented into macro events, what kind of information is expressed and how the information is ordered in the descriptions. It contains many different motion events. The tool consists of two tasks:

1. A description and recollection task, designed to elicit:
 - elaborate descriptions of complex events for the description task; and
 - concise equivalents for the recollection task
2. A reenactment task of some of the scenes on the basis of descriptions given in task 1.

Task 1 consists of two sets of video clips and stills (on DV tape and digitized on a CD). Set 1, a subset of Set 2, consists of 53 clips and 53 stills. Set 2 consists of 86 clips and 86 stills. The video clips depict various scenes with human actors and recognizable objects (for example, an actor fetches an axe and chops wood, an actor bumps into another actor who drops a plate which breaks, an actor plays a guitar over his head, scenes from a football (soccer) game, etc.). The scenes depict many different motion events. The clips are arranged in a specific order. Every seven or eight video clips for the description task are followed by seven or eight corresponding stills for the recollection task. These stills were selected by Alex Dukers from the video clips and depict a crucial moment in the event staged in the clip from which it was chosen.

The researcher elicits these data with two consultants: one acts as the addressee who has not seen the clips and stills before, and one acts as the describer who first describes the clips and then the stills. The researcher makes the addressee ask, "What happened?" (using a language/culture appropriate phrasing that focuses on the action) and the describer knows that her or his description must be such that the addressee knows what happened. After seven or eight video clips the researcher presents the stills to the describer and asks him or her to describe from memory which scene the picture belongs to, using the appropriate equivalent of the question, 'Which clip was this?'

The task is run on a laptop computer or on a DV camera. A minimum of six pairs of consultants is recommended. It takes about 40 minutes per consultant to run set 1 and at least 60 minutes per consultant to run set 2. The elicitation session should be video-recorded.

The reenactment task aims to test whether the information contained in the descriptions yielded by the first task is sufficient for a hearer to reenact the scene correctly, but it is also designed to check which parts of a complex

scenario are left to inferences based on 'stereotypicality of events (for instance, if a scene is described as 'a man throws an apple to a woman', does this imply that the apple is caught by the woman?). This second task requires that the researcher selects one representative description from the data collected during the first task for 14 scenes depicted in the video clips there. Moreover, the researcher needs some objects (a shawl or cloth, a fruit, a guitar, a chair, a table, a ball) that are necessary to act out the described scenes. The researcher either plays the tape-recorded description or reads it out himself to a pair of consultants who are asked to reenact what they have just heard in this description. Not all scenes require two actors. Then the actors themselves may decide who is the actor. When two actors are required, they may decide for themselves who acts which part.

For this task a minimum of six pairs of consultants is recommended, and it takes about 30 minutes plus optional discussion time. Again, the elicitation session should be video-recorded.⁴ The 'staged events' tool and other elicitation devices developed for the Language and Cognition group's 2001 field season can be found on our website under the following URL: <http://www.mpi.nl/world/data/fieldmanuals>.

The descriptions of these methods should suffice for the purposes pursued here. In what follows I will briefly describe the methods we developed to investigate nonverbal spatial cognition (see Danziger 1993). However, before I can do this I have to briefly present the insights we needed for developing these methods.

3 Methods to Investigate Nonverbal Spatial Cognition

The analyses of the data we gathered in the languages researched by members of our group with the help of methods like the ones described above revealed fundamental differences in how these languages refer to space (see Senft 2001: 526ff.). For describing these differences we use a typology of spatial systems or frames of spatial reference. This typology defines three such systems. We refer to them as 'relative', 'absolute' and 'intrinsic' (see Senft 1994a: 419; Levinson 1996a: 359, 365-373, 1996b; see also Bühler 1934). They differ with respect to how angles are projected from the 'ground' (or 'relatum') in order to situate the location of the 'figure' (or 'theme') that is referred to (Talmy 1978: 627; see also Klein 1991: 78; Senft 1997: 10).

Relative systems are viewpoint-dependent: localizations in space are derived from, and described on the basis of, the position and orientation of the speaker. In these systems a sentence like 'The tree is to the right of the man' is understood from the speaker's point of view only - i.e., this reference completely neglects the orientation of the man.

Absolute systems operate on absolute concepts of direction (which may be linear or defined by quadrants). They are based on conventionalized directions or other fixed bearings that can be derived from meteorological, astronomical, or landscape features. In these systems (and in our data) we

find sentences like e.g., 'The tree is to the west of the man/uphill from the man/seawards to the man.'

Intrinsic systems utilize inherent, intrinsic features of an object to derive a projected region or to anchor the spatial reference to an object in these features. In these systems a sentence like 'The tree is to the man's right' is understood as follows: A man is an object with a front and back, a left and right side assigned to it. Thus, in intrinsic systems this sentence refers to the position of the tree on the basis of the orientation of the man - the tree is at the right side of the man, then - the orientation of the speaker does not play any role whatsoever and is - within this system - completely irrelevant for the understanding of this sentence. However, we want to note here that speakers using intrinsic systems for their spatial references also refer to the same configuration with the sentence we already mentioned above, namely: 'The tree is to the right of the man.' Thus, languages can be ambiguous with respect to whether they use an intrinsic or a relative perspective in their spatial references. Sentences like the last one presented can only be disambiguated in the actual situation and context.

All three systems can be found in a given language, and they can be utilized for spatial reference; however, many of the languages we have been studying so far frequently seem to prefer one frame of reference in a particular context. Because of these observations we came up with the following hypothesis: If speakers of a language preferentially use one reference system in a particular spatial domain, then these speakers will rely on a comparable coding system for memorizing spatial configurations and making inferences with respect to these spatial configurations in nonverbal problem solving.⁵

To falsify or verify this hypothesis we developed a number of experiments to test the interrelationship between space and cognition. First of all we had to explore the cognitive implications of the three systems of verbal spatial reference. Relative (R), absolute (A) and intrinsic (I) systems differ with respect to their dependence (+) or independence (-):

- with respect to the speaker's location and orientation,
R+ A- I-
- with respect to the rotation of the spatial configuration,
R+ A+ I- and
- with respect to the rotation of the ground
R - A - I+.

Based on these differences of the three frames of spatial references we developed five different nonverbal experiment-like tests. These experiments for the investigation of nonverbal spatial cognition explore the nature of the spatial coding for memory and inference, and make it possible to determine whether this nonverbal coding has certain specific properties. These properties can then be compared to the verbal codings elicited by the first kit to see whether there is a correlation between the

verbal and the nonverbal systems of spatial coding (see Danziger 1993; Senft 1994a: 420-27; also Senft 2000 and 2001: 527ff.).

I will only very briefly describe these experiments and the considerations they are based on here (for detailed descriptions see Brown and Levinson 1993; Danziger 1993; Senft 1994a). First I want to mention that all the five tasks attempt to investigate the opposition between two different coding systems of space, namely between what we call the 'relative' coding system or frame of reference that uses expressions like 'left/right/front/back' for spatial references, and the 'absolute' system or frame of reference that uses expressions like 'north/south/east/west, uphill/downhill, seawards/ landwards, upriver/downriver", etc., for spatial references. All five tasks within this kit have the same fundamental design. The consultants are shown, a stimulus on one table (table 1) and are instructed to memorize what they have seen. After a short delay they are rotated 180 degrees and led across to another table (table 2) at a certain distance which faces in the opposite direction from table 1. The consultants are now asked to reconstruct the same array, or to select the same array from a set provided. The stimulus arrays are so designed that they have either a left/right or a front/back asymmetry when viewed on table 1.

Suppose the consultants see an arrow on table 1 that is pointing from their point of view to the right. After a short pause and after having been turned for 180° they are led to table 2. There they find two arrows; again, from their point of view one arrow is pointing to the right and the other arrow is pointing to the left. The consultants are asked now to choose the arrow that resembles the one they just saw half a minute ago on table 1. Consultants who memorized the orientation of the arrow on table 1 on the basis of a relative system of spatial coding will select at table 2 the arrow that - from their point of view - is also pointing to the right. Here the fact that standing in front of table 2 the consultants have turned 180° is of crucial importance. Consultants, however, who use an absolute system of spatial coding memorize the fact that the arrow on table 1 pointed, e.g., towards north. They will then select the arrow which is also pointing towards this direction at table 2, completely independent of the fact that they have turned 180° (see Figure 13.11).

The first experiment - 'animals in a row' - tests recall memory for spatial configurations (see Figure 13.12). Subjects look at three animals in a row, should concentrate on the relative order of animals, are then twisted 180° and asked to remake the same assemblage. The experimenter, however, is really only interested in the alignment direction.

The second experiment - 'red and blue mazes' (also called 'red and blue task') - tests recall and recognition memory for spatial configurations (see Figure 13.13). This test uses five identical cards with two differently coloured circles of different size. Subjects look at a card and should concentrate on the orientation of the circles; they are then turned 180° and are asked to select the card with the same orientation of circles from among four choices of identical, but differently oriented cards.

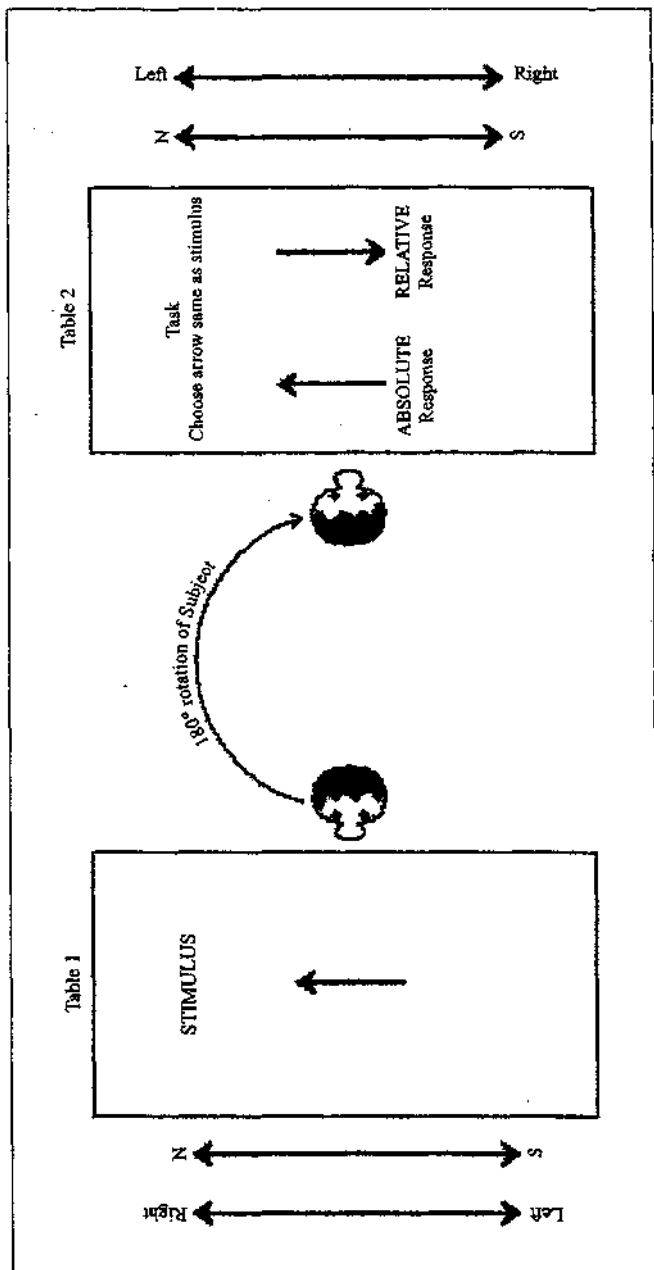


Figure 13.11: Absolute and relative frames of reference.

The third experiment - the 'maze task game' (also called 'Eric's maze task' because it was developed by Eric Pederson in cooperation with Bernadette Schmitt) - tests recall and recognition memory with respect to movement in space and the transformation of movement into the construction of a path (see Figure 13.14). The test consists of a figure resembling a little man and a maze. Subjects look at the little man being walked by the experimenter in a certain complex path and should remember this path; they are then turned 180° and are asked to select the

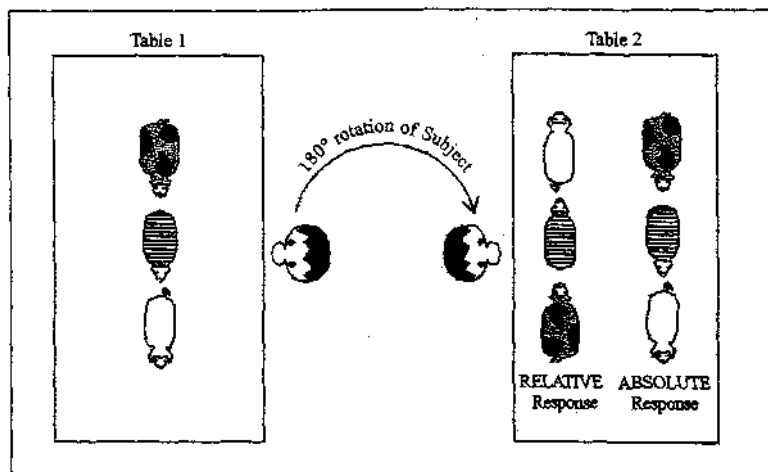


Figure 13.12: 'Animals in a row' game.

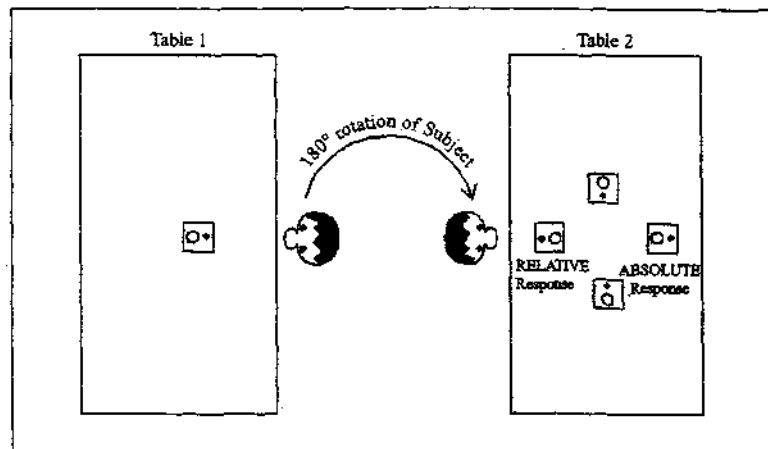


Figure 13.13: 'Red and blue mazes' games.

endpoint on a maze where the little man would end up if he had followed that path and not others on the maze (see Pederson and Schmitt 1993).

The fourth experiment - 'the scout game'. (also called 'Steve's maze task' because it was mainly developed by Stephen Levinson) - tests the ability to finish an incomplete path and recognition memory (see Figure 13.15). It consists of five separate maps with three cards - a distractor with a path that does not complete the path seen on the map, a card with a path that is

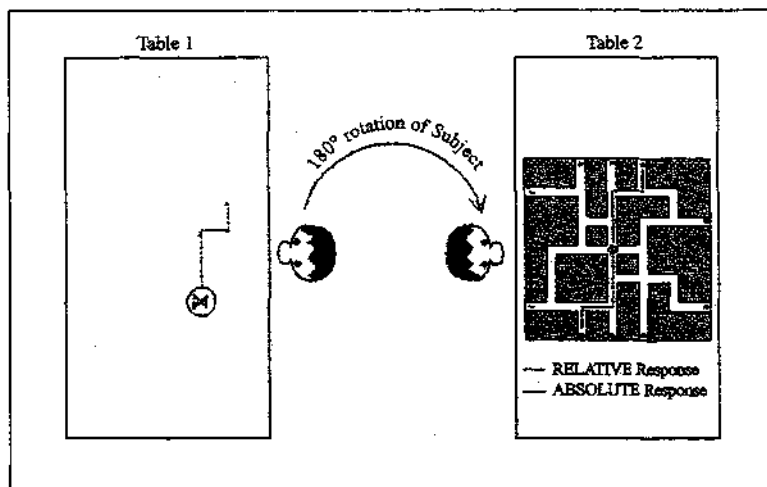


figure 13.14: 'Eric's maze' task.

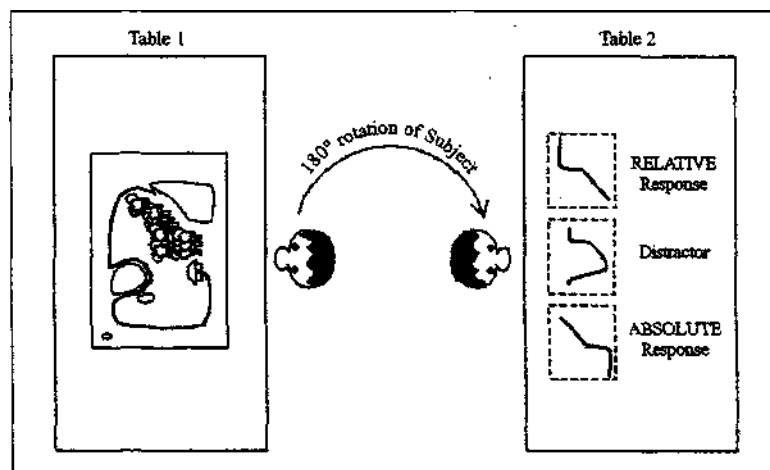


Figure 13.15: The 'scout game'.

chosen in an absolute reaction and a card with a path that is chosen in a relative response. Subjects have to look at the map and memorize it; they are then rotated 180° and are asked to choose one of the three cards that will finish the incomplete path seen on the map.

The fifth experiment - 'the transitivity task' - tests the ability to make transitive inferences. Widlok (this volume) discusses this test in detail, therefore I just mention this task but I will not describe it in more detail here.

With these experiment-like tests we collected a relatively broad data base on nonverbal problem solving in the spatial domain. Having presented all the methods to investigate nonverbal spatial cognition and a representative selection of the methods to elicit verbal reference to space we developed in Nijmegen, I will now discuss these methods with respect to their ecological validity (see also the contributions by Mishra and Dasen, Funke, and Widlok to this volume).

4 'Everything Has Its Price': Costs and Benefits of the Space Games

It turned out that all members of our group had no difficulties whatsoever playing the games we developed for testing the relationship between space and cognition. Actually, our consultants enjoyed playing all the games presented here. Another problem, however, was how to interpret inconsistencies in the overall behaviour of our consultants. I will illustrate this problem on the basis of the data I collected with my consultants on the Trobriand Islands.

In four of the five memory experiments my consultants preferred absolute solutions. This was not surprising, because these games asked (among other things) for the memorizing of the orientation of certain objects/paths - and analyses of the linguistic data have shown that Kilivila speakers prefer an absolute ad hoc landmark frame of reference system for referring to the spatial orientation of objects in a given spatial configuration (Senft 2001: 545). However, in the maze task my consultants clearly preferred a relative solution of the problem. How is this to be explained? As mentioned above, this experiment tests recall and recognition memory with respect to movement in space and the transformation of movement into the construction of a path. The test consists of a figure resembling a little man and a maze. Subjects look at the little man being walked by the experimenter in a certain complex path and should remember this path; they are then turned 180° and are asked to select the endpoint on a maze where the little man would end up if he had followed that path and not others on the maze. As already stated elsewhere (Senft 2001: 550f), it may well be that the scale of the maze and especially the man-like toy figure with its inherent intrinsic features made the consultants memorize the figure's movements using a 'left/right' system that in their solution to this memory task transformed into a relative system of spatial reference.

However, I concede that this is a rather speculative attempt to explain the data. It refers back to the problem that we have, indeed, many uncontrollable parameters {like, for example, in this task the possible influence of the size of the maze and of the movement of the figure) within the tests and experiments we devised to investigate nonverbal systems of spatial coding and their interrelation or correlation with verbal spatial coding systems. However, if we neglect the results of the 'motion maze task' experiment, we can conclude that the results of the non-verbal experiments show a rather strong correlation with the results of the verbal codification of spatial configurations in Kilivila. This example is typical of some of the problems we had with the analysis and the interpretation of such - relatively minor - inconsistencies in our data. Nevertheless, I think I can state that with respect to the methods for investigating nonverbal spatial cognition we had only marginal costs, but high benefits.

However, this does not hold for all the methods we used to elicit verbal reference to space. One of the games that turned out to be somewhat problematic for my consultants on the Trobriand Islands - at least at the beginning, was the 'man and tree' photo-photo matching task. This task was the first space game I played with my consultants on the Trobriands. This kind of elicitation situation was completely new for them -I had never before used any comparable device for eliciting linguistic data in Kilivila. It may well be that the stunning new situation with these absolutely unknown elicitation materials detracted my consultants' concentration or otherwise influenced them in a negative way with respect to their performance. It is certainly not an everyday activity for Trobriand Islanders, who only rarely deal with photographs (except with those they get either from tourists or from me), to scan 12 pictures, a subset of which depicts rather subtle differences with respect to the spatial configuration and orientation of objects like a plastic tree and a small plastic toy figure. Thus it is quite understandable, I think, to assume that the matchers decided for a picture as soon as they thought their choice would more or less match the directors' description. Moreover, I also assume that the directors did not monitor all the photographs from the very beginning of this game and that they were not aware of the fact that they really had to follow my instructions and be as exact and as exhaustive as possible in their descriptions. However, these considerations refer to only a few of many uncontrollable parameters for the field researcher in such an elicitation situation. This argumentation implies, of course, self-criticism with respect to our methodology for data elicitation. It especially questions the adequacy of the elicitation tool used, i.e. the photographs developed for this game. It may well be that these photographs as elicitation tools are much too abstract (see Nüse 1996: 91f.) and probably too Eurocentric in their sophisticated depiction of subtle spatial relationships, and thus prove inadequate for eliciting verbal data in small-scale face-to-face speech communities like the community represented by the Trobriand Islanders in the village Tauwema. Another problem we had with these pictures was that some consultants, like for

example the Australian Aboriginal speakers of the language Mparntwe Arrernte, (a language with a very sophisticated absolute frame of spatial reference), would only start to play the game if the hardly visible shadow on the photographs caused by the flashlight while taking the photos corresponded to the actual position of the sun. David Wilkins, who researched this language, reported that his consultants changed their orientation and the orientation of the playground, until the shadows in the photographs corresponded with the actual lighting conditions in their environment. Some of his consultants also criticized the fact that the pictures only showed 'whitefellas' and not people with black or brown skin.

I am absolutely aware of the fact that these are general problems for linguistic data elicitation (see Senft 1995), but I would like to note here that, especially in research projects with a comparative orientation and comparative aims, it is extremely difficult to create elicitation devices that can be used in many speech communities that are quite different from one another. Researchers who try to do this see themselves in a position somewhere between Scylla and Charybdis.

Right from the beginning of our research we were aware of the fact that these games have certain inbuilt restrictions and constraints with respect to what kind of data on spatial language is elicited with them - however, this was obviously the price we had to pay for eliciting comparative data. We attempted to design these games so that they really elicit as broad a range as possible of the vocabulary for spatial reference that can be found in the speech community under study. Moreover, playing these games requires a certain familiarity of the researchers with their fields and with the languages they research and speak themselves. It is only on the basis of their experience and their competence in the languages under study that researchers can adequately use these games for linguistic elicitation, that they can give the instructions to their consultants and that they can decide whether or not the gathered data represent - at least in part - the everyday usage of these expressions for spatial reference or whether the elicited data have to be regarded as 'artefacts' of the elicitation method. However, counterchecking already existing text corpora with the elicited data, the members of our group are convinced that this last possible interpretation of the data does not hold for the data elicited for our research purposes. Thus, like Odysseus, we feel that in the end we escaped the dangers of both Scylla and Charybdis.

To sum up, we have always been aware of what psychologists usually refer to as the 'ecological validity' problem of gathered data. We are convinced though, that the tools described here, the space games developed for focused data collection, provide the researcher with an adequate and reliable sample of speech data on spatial reference. With the space games we elicited corpora of contextually anchored yet complex interactive texts in different languages and cultures. These texts incorporate many examples of spatial language. This corpus constitutes our cross-culturally and cross-linguistically comparative data base for the

research on verbal reference to space. Aiming for comparable data had - and always will have - its costs, but we are convinced that the benefits of the corpus collected with these space games by far outweigh them.

Notes

1. This paper is based on research done by the following former or present members and guests of our group. The languages on which the members work and the respective LANGUAGE FAMILY are given in brackets following the researcher's name: Giovanni Bennardo (Tongan, AUSTRONESIAN), Balthasar Bickel (Belhare, TIBETO-BURMAN), Penelope Brown (Tzeltal, MAYA), Jürgen Bohnemeyer (Yukatek, MAYA), Niclas Burenhult (Jahai, MON-KHMER), Gabriele Cablitz (Marquesan, AUSTRONESIAN), Eve Danziger (Mopan, MAYA), Susan Duncan (Chinese), Michael Dunn (Touo, PAPUAN, Solomon Island Pijin, CREOLE, and Chuckchi, PALEO-SIBERIAN), Nick Enfield (Lao, SINO-TIBETAN), James Essegbey (Ewe, NIGER-KORDOFANIAN), John Haviland (Guugu Yimithirr, PAMA NYUNGAN and Tzotzil, MAYA), Deborah Hill (Longgu, AUSTRONESIAN), Kyoko Inoue (Japanese), Elizabeth Keating (Pohnpeian, AUSTRONESIAN), Anna Margetts (Saliba, AUSTRONESIAN), Sotaro Kita (Japanese), Lourdes de Leon (Tzotzil, MAYA), Paulette Levy (Totonac, TOTONAC), Sabine Neumann (Kgalagadi, BANTU), Eric Pederson (Tamil and Bettu Kurumba, TAMIL), Eva Schultze-Berndt (Jaminjung and Ngaliwurru, NON PAMA NYUNGAN), Gunter Senft (Kilivila, AUSTRONESIAN), Miriam van Staden (Tidore, PAPUAN) Christel Stolz (Yucatec, MAYA), Angela Terrill (Lavukalave and Touo, PAPUAN), Jürg Wassmann (Yupno, PAPUAN), Thomas Widlok (Hai//om, KHOISAN), David Wilkins (Mparntwe Arrernte, PAMA NYUNGAN), and Roberto Zavala (Oluta Popoluca, MIXE-ZOQUEAN). The director of the 'language and cognition' department is Stephen C. Levinson (Guugu Yimithirr, PAMA NYUNGAN, Tzeltal, MAYA and Yéfi Dnye, PAPUAN).

To administer the described and discussed elicitation methods in the field required specialists with sound knowledge in both the language and the culture of the groups studied. This requirement explains the arbitrary selection of languages and cultures researched in the project.

We would like to thank all the institutions involved in granting us the permission to do research in their countries and we express our deep gratitude to all the native speakers of these languages, to our friends and consultants in our fields, for their friendly and patient cooperation.

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2. These games were piloted for, and introduced to our group by Lourdes de Leon (1991) and John Haviland with inspiration from Clark and Wilkes-Gibbs (1986), von Stutterheim and Carroll (1993), and others. The method was further developed and revised by other members of our group, especially by Eve Danziger and Eric Pederson, and also by Penelope Brown, Stephen Levinson and Gunter Senft.
3. Based on an experiment devised by Jürgen Weissenborn (1986) to elicit route descriptions in children within the framework of an interactive game, and based

on a pilot study I did on the Trobriand Islands in 1992. David Wilkins in collaboration with Eve Danziger, Gertie de Groen, Deborah Hill, Steve Levinson, Paulette Levy and Eric Pederson designed the version of the route elicitation task presented here.

4. For detailed information on this elicitation tool see van Staden et al. (2001). Some of the staged event clips were designed as 'staged event' equivalents of another elicitation tool, the so-called 'Ecom clips'. These clips are designed by Jürgen Bohnemeyer and Martijn Caelen. For further details see Bohnemeyer and Caelen (2001: 168). For another film description task with which we elicited expressions describing 'ENTER' and 'EXIT' events see Senft (1999).
5. For a refined version of this hypothesis see Senft (2001: 545f.).