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Principal Investigator: Bohnemeyer, Juergen .
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Organization: SUNY Buffalo
Submitted By:
Bohnemeyer, Juergen - Principal Investigator
Title:
Spatial Language and Cognition in Mesoamerica

Project Participants

Senior Personnel

Name: Bohnemeyer, Juergen
Worked for more than 160 Hours: Yes
Contribution to Project:

Name: Benedicto, Elena
Worked for more than 160 Hours: Yes
Contribution to Project:
Conducted fieldwork on the Sumu.

Name: Capistr?n, Alejandra
Worked for more than 160 Hours: Yes
Contribution to Project:
Conducted fieldwork on Purepecha (Tarasco).

Name: Gutierrez Morales, Salome
Worked for more than 160 Hours: Yes
Contribution to Project:
Conducted fieldwork on Soteapanec (Sierra Popoluca).

Name: Mateo-Toledo, Eladio
Worked for more than 160 Hours: Yes
Contribution to Project:
Conducted fieldwork on Q'anjob'al.

Name: Palancar, Enrique
Worked for more than 160 Hours: Yes
Contribution to Project:
Conducted fieldwork on Otom?.

Name: Peralta, Valent?n
Worked for more than 160 Hours: Yes
Contribution to Project:
Conducted fieldwork on Pajapan Nawat.

Name: Polian, Gilles
Worked for more than 160 Hours: Yes
Contribution to Project:
Conducted fieldwork on Tseltal.

Name: Smythe-Kung, Susan
Worked for more than 160 Hours: Yes
Contribution to Project:
Conducted fieldwork on Huehuetla Tepehua.

Name: V?zquez, Juan Jes?s
Worked for more than 160 Hours: Yes
Contribution to Project:
Conducted fieldwork on Chol.

Name: V?zquez, Ver?nica
Worked for more than 160 Hours: Yes
Contribution to Project:
Conducted fieldwork on Cora.

Name: Zavala, Roberto
Worked for more than 160 Hours: Yes
Contribution to Project:
Conducted fieldwork on Tecpat?n Zoque.

Post-doc

Graduate Student

Name: O'Meara, Carolyn
Worked for more than 160 Hours: Yes
Contribution to Project:
Research assistant for project from August 2008 - May 2009. Will conduct fieldwork on Seri.

Name: P?rez B?ez, Gabriela
Worked for more than 160 Hours: Yes
Contribution to Project:
Research assistant for project from March 28, 2008 - August 29, 2008. Will conduct fieldwork on Zapotec.

Name: Romero Mendez, Rodrigo
Worked for more than 160 Hours: Yes
Contribution to Project:
Research assistant for project from November 1, 2007 - March 26, 2008. Will conduct fieldwork on Ayutla Mixe and Mexican Spanish.

Name: Eggleston, Alyson
Worked for more than 160 Hours: Yes
Contribution to Project:
Graduate student to Elena Benedicto at Purdue University

Name: Hernandez Green, Nestor
Worked for more than 160 Hours: Yes
Contribution to Project:
Graduate student to Enrique Palancar

Name: Hernandez Gomez, Maria de Jesus
Worked for more than 160 Hours: Yes
Contribution to Project:
Graduate student to Enrique Palancar

Name: Tucker, Randi
Worked for more than 160 Hours: Yes
Contribution to Project:
Research assistant for project from January 2010 - December 2010

Undergraduate Student

Name: Herrera, Samuel

Worked for more than 160 Hours: Yes

Contribution to Project:

Unfunded collaborator who is collecting data for the project on Huave, spoken in San Mateo del Mar, Oaxaca, Mexico. He is affiliated with the Laboratorio de Ling??stica Instituto de Investigaciones Antropol?gicas Universidad Nacional Aut?noma de M?xico.

Technician, Programmer

Other Participant

Research Experience for Undergraduates

Organizational Partners

Max Planck Institute For Psycholinguisti

Several senior members of the Language and Cognition Group at the Max Planck Institute for Psycholinguistics met with the PI and Carolyn O'Meara in March 2008 to discuss the development and piloting of the tasks used in the project. The meeting was hosted by the Max Planck Institute.

The PI spent a sabbatical semester at the Max Planck Institute in the spring of 2010. During this stay, he gave several presentations on the project's progress to researchers at the institute and discussed a wide range of issues relating to the project's work with them.

Project member Polian was invited to a two-week stay at the Max Planck Institute for Psycholinguistics in May 2010 because of the interest in Polian's preliminary findings regarding frames of reference in Tseltal. There he met with Penelope Brown and Stephen Levinson to compare his data to those obtained by Brown and Levinson in the 1990s and determine possible sources of discrepancies.

CIESAS

The MesoSpace project has a collaborative agreement with the Centro de Investigacaiones y Estudios Superiores en Antropologia Social (CIESAS) in Mexico. CIESAS Sureste in San Cristobal de las Casas, Chiapas hosted two week-long workshops in June 2008 and in October 2009 dedicated to the training of project members by the PI in the use of the research tools and the analysis of the data collected with them, respectively. CIESAS DF in Mexico City hosted a meeting of the PI with 8 project members in June 2009 dedicated to the coding, analysis and dissemination of data concerning the use of frames of reference.

Spatial Intelligence and Learning Center

SILC will provide MesoSpace with advice on aspects of quantitative research methodology. MesoSpace will provide SILC with data on which to base follow-up experimental research. The PI presented his preliminary Yucatec findings to a SILC audience at Northwestern University on October 6, 2008. Talks about a possible future personnel exchange are underway. SILC is an NSF Science of Learning Center.

Other Collaborators or Contacts

Dr. Penelope Brown (Researcher, Language Acquisition Group, Max Planck Institute for Psycholinguistics) participated in discussion related to the design of the stimuli and the experimental procedure for the project tasks during the meeting at the Max Planck Institute for Psycholinguistics in March 2008. Project member Gilles Polian has been consulting with her frequently on the analysis of frames of reference data in Tseltal including during his stay at the Max Planck Institute in May of 2010.

Dr. Niclas Burenhult (Research Fellow, Language and Cognition Group, Max Planck Institute for Psycholinguistics; Research Fellow, Centre for Languages and Literature, Lund University) participated in discussion related to the design of the stimuli and the experimental procedure for the project tasks during the meeting at the Max Planck Institute for Psycholinguistics in March 2008. Dr. Burenhult has been discussing the classification of Frames of Reference in orientation descriptions with the PI, and has agreed to be a collaborator in a follow-up project to Mesospace, now proposed to NSF.

Eric Campbell, Emiliana Cruz, and Dr. Anthony Woodbury are researchers at the University of Texas at Austin who are collecting Mesospace data for two varieties of Chatino, a family of languages belonging to the Zapotecan branch of Oto-Manguean, spoken in Oaxaca. They will be contributing data from Zenzontepec Chatino (Campbell) and San Juan Quiahije Chatino (Woodbury and Cruz), the native language of Cruz.

Prof. Eve Danziger (Department of Anthropology, University of Virginia) participated in discussions regarding the design and development of the stimuli and the piloting process. She also participated in the project workshop which took place in June 2008. She provided expertise in experimental design, as well as her knowledge of spatial language and cognition of Mopan Mayan speakers. She was a commentator at the symposium at the 2010 Annual Winter Meeting of the Society for the Study of Indigenous Languages of the Americas (SSILA) in Baltimore. She is also contributing an article to a special issue of the journal Language Sciences dedicated to the findings presented at the symposium. The issue is in press, edited by project members O'Meara and P?rez B?ez. Furthermore, Danziger advised the PI on the follow-up proposal to the project submitted to NSF in July of 2010.

Prof. Dedre Gentner (Department of Psychology, Northwestern University) is a Co-PI of the Spatial Intelligence and Learning Center (SILC), an NSF Science of Learning Center. Gentner has provided feedback on the PI's Yucatec findings and agreed to collaborate with the MesoSpace project on questions of quantitative research methodology. Gentner, the PI, and project member P?rez B?ez have been intensively exploring future experimental studies focusing on possible cognitive effects of the language-specific differences in meronymy suggested by the preliminary results of the MesoSpace project.

Dr. Rik van Gijn (Senior Researcher, Deptartment of Linguistics, Radboud University, Nijmegen; Senior Researcher, Max Planck Institute for Psycholinguistics) and Dr. Vincent Hirtzel (AssociateResearcher, Laboratoire d'Anthropologie Sociale, Paris; Senior Researcher, DoBeS Documentation Project, Max Planck Institute for Psycholinguistics) have agreed to run the MesoSpace tasks with speakers of Yurakare, a language isolate of Bolivia. Like Mesoamerican languages, Yurakare appears to have a productive geometric meronymy. If this can be confirmed, the language provides an independent test case for the central hypothesis of the MesoSpace project: that the presence of highly productive geometric meronymies disfavors the use of relative frames of reference.

Prof. Olivier Le Guen (National University of Mexico (UNAM)) participated in discussions related to the design of the stimuli and the experimental procedure for the project tasks during the meeting at the Max Planck Institute for Psycholinguistics in March 2008. Le Guen and the PI continue to consult on the analysis of spatial frames of reference in Yucatec.

Dr. Stephen C. Levinson (Director, Language and Cognition Group, Max Planck Institute for Psycholinguistics (MPI)) contributed significantly to the design and implementation of the stimuli used in the project during the meeting that was held at the MPI in March 2008. He also was a central participant during several discussions on the classification of spatial frames of reference during the PI's sabbatical stay at the MPI in the spring of 2010.

Prof. Paulette Levy (National University of Mexico (UNAM)) participated in the project workshop which took place in June 2008 by sharing her expertise of spatial semantics of Totonac.

Prof. David Mark (Department of Geography, University at Buffalo) attended numerous lab meetings during which he helped in the development and piloting of the stimuli used in the project.

Prof. Eric Pederson (Chair, Linguistics Department, University of Oregon) participated in discussions regarding the design and development of the stimuli and the piloting process. He provided assistance in the design process of the new tasks used in the project and advised the PI on the follow up proposal submitted to NSF in the summer of 2010.

Prof. Mark Sicoli (University of Alaska, Fairbanks), who works on Zapotec, participated in discussion related to the design of the stimuli and the experimental procedure for the project tasks during the meeting at the Max Planck Institute for Psycholinguistics in March 2008.

Dr. Angela Terrill (Research Fellow, Centre for Language Studies, Radboud University, Nijmegen) participated in discussion related to the design of the stimuli and the experimental procedure for the project tasks during the meeting at the Max Planck Institute for Psycholinguistics in March 2008.

Activities and Findings

Research and Education Activities: (See PDF version submitted by PI at the end of the report)

The MesoSpace project is investigating the representation of spatial information in 15 indigenous languages of Mexico, Guatemala, and Nicaragua - the largest effort in semantic typology funded by the National Science Foundation since the World Color Survey in the 1970s.

The project focuses on two unusual traits of spatial reference in Mesoamerican (MA) languages: i) the widespread absence or paucity of use of relative frames of reference (FoRs) and ii) the highly productive use of geometric meronyms, terms that describe entities as parts of larger entities, including - but not restricted to - body part metaphors. Body part terms are prototypical meronyms. MA meronymies are unusual in two respects: first, they represent perhaps the most important resource for the expression of place functions (Jackendoff 1983) in many MA languages ? in particular, in languages without spatial case markers and with few or no adpositions. Secondly, MA meronyms are systematically assigned on the basis of the geometry of the object and the shapes of its parts, not on the basis of the parts' functions. For example, in Western languages, the 'blade' and the 'handle' of a knife are labeled by terms that apply to blades and handles of other objects on the basis of their function, regardless of shape. In contrast, in Yucatec Maya, the handle is the 'leg' of the knife. There is no word for the blade as such; instead, the two planar surfaces of the blade are identified as its 'fronts'. These terms are applied to parts of similar shape in arbitrary objects regardless of function.

Two different proposals have been advanced to account for the productivity of shape-based meronymy in MA. MacLaury 1989 describes Ayoquesco Zapotec meronyms as body part terms that are metaphorically extended to other entities on the basis of a global analogical mapping process with the structure of an erect human body as its source domain and the structure of the entity described by the 'holonym' in its actual orientation as the target domain. This mapping is orientation- sensitive: the highest part of the object becomes the metaphorical 'head' and the lowest part the 'buttocks' or 'feet', depending on its shape. In contrast, Levinson 1994 describes meronym assignment in Tenejapan Tseltal as governed, not by a metaphorical mapping process, but by an algorithm that takes as input the visually segmented outline of the whole and labels parts on the basis of their shape and the axis of the entity they occur on.

The MesoSpace team of researchers is examining the conceptual basis for meronym assignment, testing predictions derived from the global-analogy account proposed by MacLaury for Zapotec and the shape- analytical algorithm proposed by Levinson for Tseltal in their field languages. The overarching hypothesis informing MesoSpace is the idea that the pervasive use of shape-based meronyms as a resource in spatial descriptions may bias the speakers of a language against relative FoRs. In languages such as Tseltal, Yucatec, and Zapotec, relative descriptions necessarily involve meronyms. But meronyms always permit alternative object-centered (intrinsic) interpretations. And since speakers are habituated to analyzing an object's geometry when applying meronyms to it, the intrinsic interpretations are favored. Absolute FoRs are not affected by this pattern since they do not occur with meronyms. The pattern thus favors the use of both absolute and intrinsic over relative FoRs. If confirmed, this nexus between meronyms and reference frames would represent evidence of a purely linguistic determinant of reference frame use (the availability of frames in discourse is trivially in part a function of the lexicon of the language; however, meronymy may affect the actual use of FoRs in discourse, not merely their availability).

The MesoSpace team developed a battery of six tasks and four stimulus sets. The stimuli include the Ball & Chair (B&C) pictures. These pictures are a tool for the study of FoR use in discourse that affords the recording of accurate profiles of both extrinsic and intrinsic frames. Previous instruments were biased in favor of extrinsic reference. Another newly developed instrument is the Novel Objects set, designed to test MacLaury's and Levinson's hypotheses concerning the meronymy of MA languages. A 92-page field manual provides protocols for how to carry out the studies, descriptions of the goals, and instructions for preliminary processing and analysis of the data (P?rez B?ez 2008). Following a week-long training workshop at the Centro de Investigaciones y Estudios Superiores en Antropolog?a Social (CIESAS) Sureste in June 2008, the team members recorded 15 to 45 hours of 'stimulated' discourse per language. The recordings are in the process of being archived with the Archive of the Indigenous Languages of Latin America (AILLA) at the University of Texas at Austin. Transcription and coding are well underway. Four further workshops at CIESAS Sureste, CIESAS D.F., and the National University of Mexico were dedicated to the coding and analysis of the data. At the most recent of these meetings at UNAM in June 2010, project members Capistr?n, V?zquez, O'Meara, Green, and Romero Mendez discussed issues of coding of the Ball & Chair data.

Project members presented preliminary results of their research on FoRs in eight of the languages of the sample in a special session at the Annual Meeting of the Society for the Study of the Indigenous Languages of the Americas (SSILA) in Baltimore in January 2010 organized by project members O'Meara and P?rez B?ez (program: http://tiny.cc/of2pj). Five of these eight presentations offered the very first descriptions of FoR use in the particular languages and also in their language families. The journal 'Language Sciences' has agreed to publish the papers presented at the SSILA session in a special issue, edited likewise by O'Meara and P?rez B?ez. The articles have been submitted to external reviewers and are expected to be in press in spring 2011.

The PI and project member Romero Mendez areorganizing a special session at the XI Encuentro Internacional de L?ng??stica en el Noroeste at the University of Sonora in November, the largest linguistics conference in Mexico (program: http://tinyurl.com/26tvgpo). The session will host presentations on meronymy in five MesoSpace languages. It will include a presentation by the new MesoSpace collaborator Samuel Herrera on the linguistic isolate Huave of Oaxaca. Polian and Bohnemeyer and Tucker (the new MesoSpace RA) will also present further work on frames of reference in Tseltal and Yucatec at the same conference.

The PI has presented his preliminary findings regarding meronymy and frames of reference in Yucatec in an invited keynote lecture at CILLA IV, the Conference on Indigenous Languages of Latin America, at University of Texas at Austin; during an invited conference presentation at the Freiburg Institute for Advanced Studies (FRIAS) in Freiburg, Germany; during refereed conference presentations at the 32nd Annual Meeting of the German Linguistics Society (DGfS) in Berlin and the conference STALDAC 2010: Space and Time across Languages, Disciplines and Cultures in Cambridge, UK, in April (this last paper is a collaboration with O'Meara); during an invited colloquium at Tilburg University in the Netherlands in April; and during two informal presentations at the Max Planck Institute for Psycholinguistics. The FRIAS and STALDAC presentations are being prepared for publication in proceedings volumes, the former in collaboration with Tucker (the new MesoSpace RA), the latter in collaboration with O'Meara. A more elaborate and formal version of the STALDAC paper is in preparation for submission to a semantics journal. A group article on cultural and geographic factors in the use of FoRs in MA by O'Meara, P?rez B?ez, Polian, Tucker, and the PI is in preparation.

The semantic typology lab meetings have continued on a weekly basis at the University at Buffalo. Lab meetings were regularly dedicated to discussions of project data and organizational matters. The PI spent a sabbatical semester in the spring of 2010 at the Max Planck Institute for Psycholinguistics. During this time, he continued communication with individual lab members via the internet.

The PI's sabbatical stay at the Max Planck Institute for Psycholinguistics was dedicated to MesoSpace and writing a book on semantic typology. The PI held extensive discussions and presentations of the findings resulting from the MesoSpace project. The talks examined implications of these findings and new research questions arising from them. They thus contributed to a new proposal for a research project on Language and Spatial Cognition Beyond Mesoamerica, which was submitted to NSF in July 2010.

Because of the interest in Polian's preliminary findings regarding frames of reference in Tseltal, he was invited to a two-weeks stay at the Max Planck Institute for Psycholinguistics in May ? coinciding with the PI's sabbatical stay - to compare his data to those obtained by Penelope Brown and Stephen Levinson in the 1990s.

A grant proposal was submitted to the Smithsonian Institution's National Museum of Natural History by project member Perez-Baez to conduct a spin-off project of MesoSpace dedicated to Zapotecan languages. Proposed project members are researchers who are themselves speakers of the languages of interest. The proposal was declined funding. Other possible funding sources are currently being explored.

Findings:

Preliminary results suggest that the use of relative frames of reference (FoRs) is not a preferred choice in any Mesoamerican language or culture, in line with the prediction in the project proposal submitted to NSF. This pattern appears to extend to the two indigenous control languages (Mayangna and Seri), suggesting that it may not be a feature restricted to the Mesoamerican sprachbund. The Ball and Chair task newly developed for this project has produced evidence of pervasive use of object-centered intrinsic FoRs (as in the intrinsic interpretations of 'The ball is in front of the chair') throughout the sample languages; this pervasive use of object-centered FoRs was hitherto unattested in most of the languages. In stark contrast to the predominantly relative Western languages, but also to the best-documented case of FoR use in MA prior to MesoSpace, that of the Tseltal of Majosik', Chiapas, as described by Brown (2006), Brown and Levinson (1992, 1993), Levinson (1996, 2003), and Levinson and Brown (1993), the object-centered frame type appears to be the most frequent for locating the ball with respect to the chair in most of the languages of the sample, especially in the Mayan and Mixe-Zoquean languages. In the two Uto-Aztecan languages of the sample, Cora and Nawat, and in Isthmus Zapotec, geocentric and head-anchored descriptions dominate in locative descriptions. Head-anchored descriptions use local landmarks or the bodies of the participants as heads of vectors that define axes of FoRs ('The ball is on my side of the chair', 'The ball is toward the door from the chair')(see below). There are no languages in the sample in which relative frames dominate in locative descriptions. Topological descriptions - descriptions based on notions of contact, containment, and proximity, which do not involve FoRs - also play an important role in locative descriptions (e.g., 'The ball is between the legs of the chair/near the back rest of the chair').

In contrast, for the task of orienting the Chair, the dominant type of FoR in most languages appears to be what Danziger (2010) calls 'direct' FoRs. In this type, the body of an observer - particularly the speaker and/or addressee - serves as the 'anchor' or basis of the coordinate system, which however - unlike in relative FoRs - is not projected onto an external ground (e.g., 'The chair is facing us'). In Levinson's (1996) classification, direct FoRs constitute a subtype of intrinsic FoRs. Alongside direct FoRs, landmark-based ones, in which the location (rather than the geometry) of some reference entity serves to anchor the FoR, play an important role in descriptions of orientation (e.g., 'The chair is turned towards the door').

Among the most unexpected findings of the project to date are the pervasive use of cardinal direction terms and absolute FoRs in Isthmus Zapotec and the low importance of absolute FoRs in the three Tseltal varieties studied by Polian. Absolute terms dominate in Zapotec locative descriptions, and the orientation descriptions are almost entirely absolute. No obvious correlation with age, gender, or literacy of the speakers

has emerged. In the case of Tseltal, absolute descriptions play a secondary role in Ch'ajkoma, the closest of the three communities to Majosik', where Brown and Levinson's studies were conducted; absolute use in the other two is marginal. Polian met with Brown and Levinson to determine the source of the discrepancy between his data and theirs. It was found that neither the differences between the stimuli nor variation in literacy or bilingualism could account for the variation. Instead, topography was isolated as at least one likely influence. The same absolute terms <ajk'ol> 'up' and <alan> 'down' are present in all four communities. The reason these terms are used more frequently in Majosik' than in Ch'ajkoma and much more frequently in Ch'ajkoma than in the other two communities is the relative location and orientation of each community vis-?-vis the mountain slope. This may at first seem to support Li & Gleitman's (2002) environmental determinism. However, the variable language does not vary across the four Tseltal communities. But Li & Gleitman hold that FoR use is not affected by the variable language in situations where it does vary. Their position predicts, for example, that if one were to discover somewhere in the Rocky Mountains an English-speaking community in a place whose topography is an exact mirror image of that of Majosik', then ? all else being equal - those English speakers should use <up> and <down> in the same way the inhabitants of Majosik' use <ajk'ol> and <alan>, and those English speakers would show the same linguistic and cognitive bias in favor of absolute FoRs. The MesoSpace Tseltal data neither contradict nor support this prediction. Polian & Bohnemeyer (under review) argue that Polian's findings support environmental constraints on FoR use, but not environmental determinism.

Another unexpected result of the research of the MesoSpace project has been the finding of frequent violations of the principle of canonical orientation (POCO; Levelt 1984, 1996) in several of the languages of the sample. POCO states that in order for the location of a figure to be described with respect to a given ground in an object-centered FoR, the ground ? or at least those parts of it the description projects regions from - must be in canonical orientation. For the top-bottom axis, and spatial regions selected along it, canonical orientation inside a gravitational field generally means alignment with that gravitational field (see Friederici & Levelt (1990) for an experimental study under zero-g conditions). That this principle is no more than a strong tendency was implicitly demonstrated in a series of experiments reported in Carlson-Radvansky & Irwin (1993, 1994). These studies focused on the relator <above> of English, manipulating stimuli and the participants' orientation to create configurations in which <above> applies under an object-centered, relative, or absolute interpretation to the exclusion the other options ('disaligned') or under two or all three interpretations simultaneously ('aligned'). A production study showed that 95% of participants describe the figure as 'above' the ground in case the three interpretations align. If exclusively the vertical orientation of the observer changes, the number drops to 93%. If the figure is above the ground in absolute terms alone, but neither in intrinsic nor in relative terms, the number of <above> responses comes down to 76%. And 30% still describe the figure as 'above' the ground in case exclusively the intrinsic perspective applies. There is ? so far mostly anecdotal ? evidence that disaligned intrinsic uses of vertical terms may be more common in MA than in European languages. The only language of the MesoSpace sample for which a preliminary quantitative analysis has been performed to date is Yucatec Maya. 12 of the 48 pictures of the B&C task feature the chair in non-canonical orientation (i.e., not standing up). 10 of these afford disaligned intrinsic descriptions. 36% of the Yucatec descriptions of these 10 pictures feature intrinsic FoRs, compared to 4% of the English descriptions collected from five pairs of University at Buffalo undergraduate students in a pilot. (The English numbers diverge from those in Carlson-Radvansky & Irwin (1993) due to the differences between the two tasks.) Moreover, Yucatec speakers produced intrinsic descriptions not merely under disalignment, but also in situations where absolute descriptions are in fact available, but involve the inverse relator. These findings are the first pieces of evidence suggesting that POCO may be language-specific. It seems likely that this contrast is directly attributable to the much greater overall importance of object-centered frames in Yucatec: 56% of all pictures elicited object-centered locative descriptions in Yucatec, compared to just 22% in English. The PI and Tucker will present an analysis of the Yucatec data on the intrinsic use of vertical relators at the XI Encuentro Internacional de Linguistica en el Noroeste at the University of Sonora in November of 2010. An ongoing line of investigation in this research concerns the role of meronyms as a possible predictor of intrinsic uses of vertical relators. Vertical relators in Yucatec and other MA languages are meronyms, and Yucatec meronyms are assigned primarily on the basis of the object's canonical orientation rather than its actual orientation, thus giving rise to a potential for intrinsic references to the vertical independently of the object's orientation vis-?-vis the Earth's field of gravity.

The B&C data also produced evidence of 'referential promiscuity', defined by the unrestricted availability of spatial FoRs and the lack of a default perspective, in Yucatec. Speakers switched freely between FoRs and often combined multiple types in single descriptions. Bohnemeyer (under review) describes this style of FoR use. He argues that only absolute and relative FoRs allow speakers to maintain a default perspective that remains unchanged across contexts and referential grounds. There are also language communities that have been described as making use exclusively of intrinsic FoRs, such as Mopan Maya (Danziger 2001) and Kilivila (Oceanic, Papua New Guinea; Senft 2001, 2006). On the PI's proposed typology, referentially promiscuous languages such as Yucatec (other candidates include the Kwa language Ewe of Ghana and Togo (Ameka & Essegbey 2006) and the Bantu language Kgalagadi of Botswana (Levinson 2003)) share with intrinsic-only languages the absence of a default perspective, but with predominantly relative and predominantly absolute languages the availability of extrinsic FoRs.

Bohnemeyer & O'Meara (under review) have examined the use of FoRs in orientation descriptions in the Seri and Yucatec B&C data. They show that FoRs play an equally important role in representations of the orientation of entities as they do in representations of their location and direction of motion. They propose that orientation is conceptually encoded, not in terms of metaphorical path functions (Jackendoff 1983), but in terms of vectors, a separate type of primitive conceptual function. Equipped with the notion of vectors, they introduce a distinction between two classes of FoRs: classical 'angular-anchored' FoRs and the previously unrecognized 'head-anchored' FoRs. In English, angular-anchored

relative FoRs dominate in both locative and orientation descriptions. In contrast, in Seri and Yucatec, object-centered angular-anchored FoRs dominate in locative descriptions, but head-anchored FoRs dominate in orientation descriptions.

A recall memory task ('New Animals') has produced evidence of a preference for geocentric memory coding in 12 of the populations and 'mixed' responses without a clear bias for either geocentric or egocentric coding in the others. None of the populations displayed a preference for egocentric coding. The task requires participants to commit arrays of farm animal toys located on a table to memory and then to reproduce them on a different table after turning 180 degrees. This task is designed to study preferences for frames of reference in recall memory to see whether these align with those in discourse. New Animals is modeled closely on the Animals-In-A-Row task originally released as part of Danziger (1993). Analysis of the results continues.

As for the second domain investigated by the MesoSpace team - productive terminologies for object mereologies - the following picture has begun to emerge based on the project members' first reports of data collected with the Novel Objects tasks: As predicted, meronyms appear to play a prominent role in identifying the parts of the Novel Objects throughout the MA sample. A similar distribution is shaping up for the southern control language Mayangna, but not for Seri spoken north of the MA area. However, it is not obvious that it is readily possible in any of the languages of the sample to extend meronyms to all parts of all of the Novel Objects. There does appear to be an element of conventionality in the use of Mesoamerican meronymies that neither the account of MacLaury 1989 nor that of Levinson 1994 predicts. For Yucatec, the critical distinction is that between volume meronyms, whose assignment appears to be subject to convention, and surface and curvature extreme meronyms, which are applied to arbitrary parts that satisfy their truth conditions (see the first-year report). It remains to be seen which factors limit productivity in the other languages.

An interesting finding that has emerged from two elicitation studies conducted with picture books is that while human and animal body part terms are readily extended to parts of artifacts, their use with plant body parts tends to be rather more limited in most languages. Plant mereologies appear to be properly lexicalized throughout Mesoamerica - a finding predicted neither by MacLaury's (1989) nor by Levinson's (1994) accounts. Preliminary evidence suggests that this pattern extends to Seri, but not to Mayangna, where human/animal body part terms are more regularly applied to plant parts.

Five of the project members will present their findings on meronymy during a special session at the XI Encuentro Internacional de Linguistica en el Noroeste at the University of Sonora in November of 2010 organized by Romero Mendez and the PI. A follow-up proposal to the MesoSpace project submitted to NSF in July of 2010 has meronymy as one of its foci, planning to carry the investigation to meronym systems in languages of South America, Africa, and Asia.

Training and Development:

The weekly meetings of the semantic typology lab provide an environment in which project members and University at Buffalo graduate students and faculty members have benefited from discussion of methodological issues and findings of the MesoSpace project.
The new research assistant has become familiar with the process of administering a multi-national collaborative research project involving 19 researchers from nine institutions. She has also gained experience in research planning and continuation through the preparation of a follow-up grant proposal for the continuation and expansion of the project.

Project members O'Meara and Perez Baez have been editing a special journal issue resulting from the symposium they organized at the 2010 Annual Winter Meeting of the Society for the Study of Indigenous Languages of the Americas, gaining first hand experience in the editorial process of linguistics journals.

MesoSpace has contributed to the training and academic advancement of nine graduate students, five of whom are Mexican citizens. At the start of the MesoSpace project, 11 of the members were graduate students; during the course of the project, six of these graduated. The group includes three winners of the Mary R. Haas Book Award of the Society for the Study of the Indigenous Languages of the Americas, which annually honors one unpublished manuscript ? usually a doctoral dissertation - that makes a significant contribution to the scientific study of the indigenous languages of the Americas, including the 2008 and 2009 winners. The project provides excellent training opportunities for the students. They are instructed in cutting-edge methods of semantic typology and spatial semantics and gain hands-on experience in field research and in the analysis of data under the direction of the PI and through the discussion of the results with their peers during the project meetings and the symposium on meronymy. They are also provided with multiple opportunities to publish their results in edited volumes and scientific journals, and to thus further their academic careers.

Outreach Activities:

MesoSpace advances the description of 15 indigenous minority languages of Mexico, Guatemala, and Nicaragua. All of these must be considered at least somewhat endangered and most of the smaller languages as severely endangered (e.g., Huehuetla Tepehua). All of the

indigenous minority languages of the sample are severely under-described in comparison to Euro-American languages. Four of the project members are native speakers of indigenous languages and thus members of marginalized ethnic minorities who are empowered to become agents, rather than subjects, of the scientific study of their languages and cultures. The project also furthers the collaboration of research institutions in Europe, Mexico, and the U.S., thereby helping to integrate a global academic community.

Journal Publications

Bohnemeyer, J., "Spatial frames of reference in Yucatec: Referential promiscuity and task-specificity", Language Sciences, p. , vol. , (2011). Submitted,

O'Meara, C., "Frames of reference in Seri", Language Sciences, p. , vol. , (2011). Submitted,

Vazquez Soto, V., "The "uphill" and "downhill" system in Meseno Cora", Language Sciences, p. , vol. , (2011). Submitted,

Eggleston, A., Benedicto, E., "Spatial frames of reference in Sumu-Mayangna", Language Sciences, p. , vol. , (2011). Submitted,

Romero Mendez, R., "Frames of reference and topological descriptions in Ayutla Mixe", Language Sciences, p. , vol. , (2011). Submitted,

Hernandez-Green, N., R. Palancar, E. L., Hernandez, S., "The loanword lado in Otomi spatial descriptions", Language Sciences, p. , vol. , (2011). Submitted,

Capistran Garza, A., "Locative and orientation descriptions in Tarascan: Topological relations and frames of reference", Language Sciences, p. , vol. , (2011). Submitted,

Polian, G., Bohnemeyer, J., "Consistencies and variation in Tseltal spatial frames of reference", Language Sciences, p. , vol. , (2011). Submitted,

Perez Baez, G., "Spatial frames of reference in Juchitan Zapotec", Language Sciences, p. , vol. , (2011). Submitted,

Books or Other One-time Publications

Bohnemeyer, J., O'Meara, C., "Vectors and frames of reference:
Evidence from Seri and Yucatec", (2011). Book, Submitted
Collection: Proceedings of STALDAC 2010:
Space and Time across Languages,
Disciplines and Cultures
Bibliography: Amsterdam: John Benjamins.

Bohnemeyer, J., Tucker, R., "Space in semantic typology: Object-centered geometries", (2011). Book, Invited, in preparation.
Editor(s): Auer, P., M. Hilpert, A. Stukenbrock, and B. Szmrecsanyi

Collection: Proceedings of the FRIAS Language and Space Workshops: Space in language and linguistics: Geographical, interactional, and cognitive perspectives
Bibliography: Berlin: Walter de Gruyter

Web/Internet Site

URL(s):
http://www.acsu.buffalo.edu/~jb77/Mesospace.htm
Description:

Other Specific Products

Product Type:

Field Manual

Product Description:

This product is the 2008 Field Manual for the project. It was designed as a resource for project members regarding the objectives of the project and it provides guidelines on how to run the tasks and analyze the data.

Sharing Information:

The 2008 Field Manual is available on the project website:
http://www.acsu.buffalo.edu/~jb77/MesoSpaceManual2008.pdf

Contributions

Contributions within Discipline:

The work of the MesoSpace team is shaping up to make significant contributions to (i) the scientific description of individual languages; (ii) linguistic typology, the study of the distribution of language structures, sounds, and linguistically expressed meanings across languages; and (iii) the theory of language.

(i) The project examines the use of spatial frames of reference in 15 indigenous languages of Mexico, Guatemala, and Nicaragua. Reference frames are conceptual coordinate systems used to interpret spatial representations - linguistic and cognitive representations of the location, orientation, and motion of objects in space. For all but two of the 15 languages, no published accounts of the use of reference frames are available - the MesoSpace research is mapping vast swathes of terra incognita here. Many of these languages are endangered, and moreover, there is evidence suggesting that the use of reference frames by the speakers of these languages is rapidly changing under the influence of contact with Spanish. The work of the MesoSpace team may represent the last best opportunity of obtaining scientific records of many of these unique cultural systems of spatial knowledge. Reports on eight of the languages of the sample are currently under review for publication in a special journal issue expected to appear in the spring of 2011. In the case of the MesoSpace language most extensively studied prior to the project, Tseltal Maya, the results of project member Polian indicate important corrections to the earlier descriptions of reference frames in this language.

The project has also been exploring a second, related domain of spatial language, namely so-called 'meronyms', terms for object parts. Many languages of the area make pervasive use of meronyms as a resource for the expression of spatial relations. Their speakers would for example describe the vertical position of the ball as 'top' or 'head' or 'bottom' of the chair. The project documents both the use of meronyms in spatial descriptions and the conceptualization of part-whole relations or 'mereology' that underlies the assignment of meronyms to objects. These systems are strikingly different from what is found in better studied languages, and individual languages appear to vary a surprising amount in terms of their mereologies. For all but four of the languages of the sample, these are the first studies of their meronymy ever undertaken.

(ii) Until recently, it was universally taken for granted by linguists and cognitive scientists that the use of spatial frames of reference is innate and does not vary with language and culture. All human populations were assumed to show the same bias in favor of egocentric, 'relative' representations found in speakers of English or Japanese, who would describe, say, a ball as being 'left of' or 'in front of' a chair depending on the viewpoint of the speaker (or, more generally, an observer). In the late 1970s, the first reports emerged indicating that Aboriginal people of Australia tend to make almost exclusively use of geocentric or 'absolute' frames, describing, in the above example, the ball as being 'west of' or 'south of' the chair. Crosslinguistic research on this phenomenon began in the 1990s. It was quickly discovered that there is in fact a bewildering array of different kinds of frames across human populations, often modeled, for example, after local topographic features such as mountain slopes or the courses of rivers. It became apparent that there is enormous variation across cultures in terms of which reference frames their members prefer for solving a given task. And this variation was found to have profound consequences for spatial cognition. Frames of reference are not mutually translatable: if one remembers the ball exclusively as being 'west of' the chair, this will not allow one to determine later where it was with respect to the chair from the perspective of the observer. Conversely, if the location of the ball is remembered in egocentric terms, its location in absolute or geocentric space cannot be inferred from this representation. Consequently, people tend to memorize spatial information in the same frames they prefer to communicate it linguistically.

These findings raise important questions about the boundary between innate and cultural knowledge in spatial cognition and the relationship between spatial cognition and language. In order to be able to address these questions, it is vitally important to survey the linguistic systems and cognitive styles used by the speakers of different languages according to standardized scientific methods and protocols. This is the job of semantic typology, a subfield of linguistic typology. The members of the MesoSpace research team have been undertaking the largest and most comprehensive survey of the use of spatial frames of reference in a large multilingual and multicultural geographic area to date. In doing so,

they have also pioneered the application of methods of semantic typology to such an area. This 'areal' approach to typology opens up unique opportunities for isolating linguistic, cultural, and topographic/environmental factors influencing spatial cognition.

Preliminary results are presented in more detail in the Findings section of this report. They indicate a much more restricted use of observer-dependent, relative frames across the area compared to better studied European languages or Japanese. However, there is evidence to the effect that the use of relative frames is on the rise among younger speakers as a function of integration in the dominant Spanish-speaking national cultures. In some languages of the area, absolute frames dominate; in many others, object-centered 'intrinsic' frames are the most frequently used type. Intrinsic frames project spatial coordinates from the reference entity itself. For example, the ball is intrinsically 'in front of' the chair when it is located in a region proximate to the chair's inherent front.

A central typological hypothesis of the MesoSpace project is the idea that the pervasive reliance on meronyms for the expression of spatial relations may bias the speakers of a language against the use of relative frames. The rationale behind this idea is that both relative and intrinsic reference requires the use of meronyms in the languages in question. Whereas Western languages have large, specialized meronymic vocabularies assigned according to the functions of the parts, many Mesoamerican languages have general-purpose meronyms that are assigned across arbitrary classes of objects according to the geometry of the parts and the whole. For example, English speaker identify the 'handle' and 'blade' of a knife as major parts and extend the terms 'handle' and 'blade' to parts of other objects that have similar functions, such as the handle of a container or the blade of a circular saw. In contrast, in Yucatec Maya, the handle of the knife is identified as its 'leg' on the basis of its shape and position in the geometric structure of the knife. 'Leg' is not applied to the handle of a container, which is most likely its 'ear'; instead it is used for example in reference to a lamp post. There is no word that translates 'blade'. Instead, both planar surfaces of the blade of the knife are identified as the knife's 'fronts', and this term extends to other salient flat or convex surfaces of arbitrary objects, but not to the blade of a circular saw, which would be (a part of) the saw's 'belly'. Since both intrinsic and relative reference to an object require the assignment of meronyms to it in languages such as Yucatec and relative reference is done on the basis of the geometry of the observer's body rather than that of the geometry of the reference object, the pervasive practice of assigning meronyms to an object on the basis of its shape habituates speakers against relative interpretations. This hypothesis is currently being tested by the members of the project in their respective field languages and so far has held up to these tests.

An unexpected finding is the intrinsic use of terms for vertical relations regardless of the orientation of the reference object vis-??-vis the gravitational vertical in Yucatec and, according to preliminary reports, in several other project languages. A ball resting on top of the underside of an inverted chair may be naturally described as being 'under' the chair in these languages. This phenomenon, which confounds previous assumptions about the universal dominance of gravitational absolute frames in vertical reference, could be a direct consequence of the use of meronyms for the expression of vertical relations and the overall preference for intrinsic reference in languages such as Yucatec.

Previous reports suggest that the principles governing the assignment of meronyms are not uniform across Mesoamerican languages, but may vary from language to language. It is an important part of the MesoSpace agenda to examine and compare the meronymies found across the area. For example, in Yucatec, meronym assignment depends mostly only on the canonical orientation of the object in the vertical, not on its actual orientation. In contrast, in some languages, the assignment of the terms appears to depend strictly on the object's actual orientation, such that the 'head' is whichever part is highest in the field of gravity at the time of reference. In such languages, purely intrinsic descriptions of vertical relations such as that illustrated for Yucatec above should be impossible. This prediction is currently being tested.

The typological study of the distribution of reference frames across languages and cultures must be informed by, and at the same time provides the empirical basis for, the classification of frame types as spelled out by theoretical treatments. The MesoSpace researchers have found evidence of a previously unrecognized dichotomy being 'angular-anchored' and 'head-anchored' frames discussed in the following subsection. The distribution of these types appears to vary across languages and is likewise being studied by the team.

Another typological distinction that has emerged from the work of the project is that between languages that show restrictions excluding the use of particular types of frames from important domains of reference (for example, most varieties of English do not use cardinal direction terms to locate a ball vis-??-vis a chair) and 'referentially promiscuous' languages such as Yucatec which appear to lack such restrictions.

(iii) The findings of the MesoSpace project have significant potential implications for the theory of spatial frames of reference and the debate about language as a possible formative factor in forging culture-specific habits or practices of cognition.

Work by the PI and project member O'Meara on the use of reference frames in two of the languages of the MesoSpace sample, Seri and Yucatec, suggests a new dichotomy of frame types unrecognized by previous classifications. Most traditionally recognized intrinsic, relative, and absolute frames are 'angular-anchored', in the sense that they copy a set of axes from a model entity or 'anchor' and project it onto the reference entity, which serves as the origin of the coordinate system. For example, in relative interpretations of 'The ball is left of the chair', the axes of the observer's body are projected onto the chair, and the 'geomorphic' frame of 'The ball is downriver from the chair' is constituted by the projection of an axis derived from the course of some river onto the chair. Bohnemeyer and O'Meara contrast this against a 'head-anchored'

type, whose axes are computed as vectors pointing towards or away from the anchor. So-called 'landmark-based' frames are head-anchored, as in 'The ball is towards the door from the chair.' There is also an egocentric version of head-anchored types, instantiated for example by 'The ball is towards us from the chair' or the equivalent 'The ball is on our side of the chair.' Celestial frames, such as sunset/sunrise-based frames, by hypothesis originate as head-anchored systems which are subsequently commonly reinterpreted as angular-anchored once their axes are understood as abstract invariable bearings. The head-angular dichotomy has important consequences for the heuristics used to identify frame types in semantic analysis: whereas angular-anchored frames depend on the orientation of the anchor ('The ball is left of the chair' becoming false when the speaker turns 180 degrees), but not on its location, head-anchored frames conversely depend on the location of the anchor, but not on its orientation. Bohnemeyer and O'Meara show that in Seri and Yucatec, angular-anchored frames dominate in locative descriptions ('The ball is left/south of the chair'), whereas head-anchored frames dominate in orientation descriptions ('The chair is facing us/the door'). The role of reference frames in the representation of the orientation of entities has received very little attention in the theoretical literature so far. Bohnemeyer and O'Meara's account argues against the treatment of orientation in terms of metaphorical motion paths proposed in the influential work of Jackendoff 1983 and instead strengthens the case for vectors as primitives of spatial cognition and semantics.

The discovery of the crosslinguistic variation in reference frame use and the alignment between population-specific preferences for frames in discourse and cognition has greatly fueled the debate about the possible role of language as a causal factor in non-linguistic cognition - in other words, the so-called Sapir-Whorf Hypothesis or Linguistic Relativity Hypothesis, according to which 'language influences thought.' Proponents of a 'Whorfian' or 'relativistic' interpretation of the alignment argue that since cultures differ in their preferences or habits of spatial cognition, their members must learn their group's preferences from observable behavior, and thus foremost from language use. Opponents claim instead that the observable cultural differences are shallow and easily mutable in response to factors such as literacy and the environment. On these accounts, spatial cognition is uniform across populations in terms of abilities and merely diverse in terms of the use of these abilities.

The MesoSpace work on meronyms discussed in the previous subsection directly bears on this question. If meronyms can be confirmed to be a linguistic factor influencing reference frame use in both language and spatial memory and reasoning, this would strengthen the relativistic view of habits of reference frame use as deeply culturally entrenched and of language as playing a key role in the intergenerational transfer and cultural diffusion of these habits.

The members of the MesoSpace team are also exploiting the unique affordances of the Mesoamerican cultural and geographic area to test the possible role of nonlinguistic factors in influencing reference frame selection. A group publication based on linguistic, cognitive, population-geographic, and topographic data from the communities of the MesoSpace sample is in preparation. Of special relevance in this connection is the work of team member Polian on influences of the local topography on reference frame use across four Tseltal Mayan communities discussed in the Findings section.

Contributions to Other Disciplines:

Spatial frames of reference are a subject studied across the cognitive sciences, by linguists, anthropologists, psychologists, and computer scientists. The project's contributions to the theory of spatial frames discussed in the previous section are thus relevant to these disciplines as well. In a similar vein, the Linguistic Relativity Hypothesis is of key concern, not merely to linguists, but to all cognitive scientists. The group's efforts to isolate linguistic and non-linguistic factors influencing reference use thus make a contribution with a potential impact far beyond the discipline of linguistics.

The surprising findings mentioned above regarding the intrinsic use of vertical relators in some languages of the sample bear on the so-called Principle of Canonical Orientation originally proposed by Levelt 1984, according to which intrinsic frames of reference can only be projected from reference entities that are in canonical vertical orientation. The MesoSpace findings provide the first-ever report of evidence to the effect that this principle may be language-specific. Previous research on the Principle of Canonical Orientation (see Findings section) has been conducted primarily by psychologists.

Contributions to Human Resource Development:

The project contributes to the training and academic advancement of five graduate students and four junior scholars who defended their dissertations within the two years since MesoSpace was launched. Six of these are Guatemalan or Mexican citizens; four of them are native speakers of indigenous languages; and three of them are women. In all, eight of the 19 members of the MesoSpace team are women and twelve are citizens of Mexico or Guatemala.

Contributions to Resources for Research and Education:

The project has inspired intensive collaboration between the University at Buffalo, the Max Planck Institute for Psycholinguistics, the Centro de Investigaciones y Estudios Superiores en Antropologia Social (CIESAS) of Mexico, and the NSF-funded Spatial Intelligence and Learning Center (SILC). Collaboration has more recently begun with the Laboratorio de Linguistica of the Instituto de Investigaciones Antropologicas of the Universidad Nacional Autonoma de Mexico (UNAM) in Mexico City.

Contributions Beyond Science and Engineering:

Conference Proceedings

Special Requirements

Special reporting requirements: None
Change in Objectives or Scope: None
Animal, Human Subjects, Biohazards: None

Categories for which nothing is reported:

Contributions: To Any Beyond Science and Engineering
Any Conference

Researcher	Language	Field site	Duration of stay	Participants per task							
				Picture book elicitation		Novel Objects matching tasks		Ball & Chair task	New Animals task	Male consultants (total)	Female consultants (total)	Total
				Part identi-fication	Local-ization wrt. parts	Part identi-fication	Local-ization wrt. parts					
Pilot	English	Buffalo, New York	Spring 2008							11	41	52
Juergen Bohnemeyer	Yucatec Maya	Yaxley, Quintana Roo, Mexico	6/8/08-7/29/08	7	3	5 x 2	5 x 2	5 x 2	18			
Alejandra Captistrán	P'orhépecha	Santa Fe de la Laguna, Municipio de Quiroga, Michoacán, Mexico	8/31/08-9/13/08	6	6	5 x 2	5 x 2	5 x 2	19	10	13	23
Susan Smythe Kung	Huehuetla Tepehua	Huehuetla, Hidalgo, Mexico	6/13/08-7/24/08	4	10	5 x 2	5 x 2	5 x 2	25	9	19	28
Juan Jesús Vázquez	Chol	Tila, Chiapas, Mexico	6/20/08-7/10/08	10	5	7 x 2	7 x 2	3 x 2	10			16
Salome Gutierrez Morales	Sierra Popoluca (Soteapanec)	Soteapan, Veracruz, Mexico	7/19/08-8/12/08	6	6	5 x 2	5 x 2	5 x 2	16	10	8	18
Elena Benedicto	Sumu/Mayangna	Rosita, Nicaragua	6/11/08-7/15/08	4	4	5 x 2	4 x 2	5 x 2	10	23	11	34
Carolyn O'Meara	Seri	El Desemboque del Rio San Ignacio, Sonora, Mexico	11/11/08-12/22/08	5	4	5 x 2	5 x 2	5 x 2	16	4	19	23
Valentin Peralta	Pajapan Nawat	Pajapan, Veracruz, Mexico	10/10/08-10/29/08	4	4	6x2	6x2	6x2		5	8	13
Veronica Vazquez	Cora	Presidio de los Reyes, Nayarit, Mexico	10/16/08-11/2/08	5	5	5x2	5x2	5x2	20	14	12	26
Roberto Zavala	Zoque	Tecpatan, Chiapas, Mexico	3/7/09-3/15/09	4	4	5 x 2	5 x 2	5 x 2	10	8	9	17
Gilles Polian	Tseltal	Mesbilja, Chiapas, Mexico	Feb-09			5x2	5x2	7x2	27	19	8	27
Gilles Polian	Tseltal	Cabecera Tenejapa, Chiapas, Mexico	3/20/2009-4/2009			5x2	5x2	5x2	19	4	15	19
Gilles Polian	Tseltal	Chacoma Tenejapa, Chiapas, Mexico	Sep-09					5x2	17	9	8	17
Enrique Palancar	Otomi	San Ildefonso Tultepec, Municipio de Amealco, Querétaro, Mexico	3/28/09-04/03/09	3	1	5 x 2	5 x 2	5 x 2	23	6	17	23
Gabriela Perez Baez	Juchiteco	La Ventosa, Juchitán de Zaragoza, Oaxaca, Mexico	May 20 - June 4 2009	12	12	6 x 2	6 x 2	6 x 2	27	12	15	27
Rodrigo Romero Mendez	Ayutla Mixe	Ayutla (San Pedro y San Pablo Ayutla), Oaxaca, Mexico	10/7/2008-11/3/2008, 7/17/2009-8/10/2009	5	5	5x2	5x2	5x2	16	5	15	20
Rodrigo Romero Mendez	Mexican Spanish	Santa Ines, Texcoco, Mexico	9/18/2009-present	6	0	6x2	6x2	6x2	9	4	9	13
Eladio Mateo Toledo	Q'anjob'al	Santa Eulalia, Huehuetenango, Guatemala	5/30/2009-6/25/2009	2	2	7x2	7x2	9x2	20	10	17	27
Total												423