Patterns of variation in the use of spatial frames of reference in four Nahuatl dialects

The use of spatial frames of reference has been heavily investigated in Meso America where languages have been shown to prefer allocentric frames of reference in contrast to egocentric strategies (O'Meara & Pérez Báez, 2011). This is also found in the two Nahuatl varieties that has been documented in this regard: the Nahuatl variety spoken in El Salvador, and the Nahuatl variety spoken in the community of Las Gardenias, Puebla (Hernández Vázquez, 2014; Salgado Ramírez, 2014). Although previous studies in Meso America find a strong preference for allocentric frames of reference, they also document substantial variation both within and between languages.

This chapter seeks to investigate the nature of this variation regarding the use of frames of reference in four dialects of Nahuatl. To investigate this, we examine comparable data from four varieties: Nahuatl spoken in Tequila, Veracruz; Cuacuila, Puebla; Tancanhuitz, San Luis Potosi; and Mecayapan; Veracruz . The goal of the chapter is two-fold. Firstly, a description of the use of spatial frames of reference is central to the description of the spatial grammar of the language. Therefore, we investigate and describe what linguistic resources are available to the speakers of the different dialects and which spatial frames of reference are preferred both linguistically and non-linguistically. Secondly, frames of reference play an important role in discussions of the relationship between cognition, culture, landscape, and language (e.g. Pederson et al., 1998; Li & Gleitman, 2002; Majid et al., 2004; Palmer et al., 2017). This aspect is important in relation to the overall goal of the book. Consequently, we relate the description of the use of spatial frames of reference to both sociolinguistic and topographical parameters so the descriptions can contribute to larger theoretical debates of what factors has an influence on linguistic diversity in the spatial domain of language.

To research the use of spatial frames of reference we have carried out three tasks designed to be comparable across languages and communities. The tasks are developed by the Max Planck Institute for Psycholinguistics in Nijmegen and the MesoSpace project at the University of Buffalo. Specifically, we have used the Man & Tree game (Levinson et al., 1992), the Ball & Chair game (Bohnemeyer & Pérez Báez, 2008), and the New Animals task [Bohnemeyer & Pérez Báez (2008)). The Man & Tree game and the Ball & Chair game are both so-called director-matcher tasks, where participants are asked to solve a communicative task which requires the use of spatial frames of reference. The participants are encouraged to discuss among themselves, and this prompts somewhat naturalistic conversational data rich in usage of frames of reference that is comparable. The New Animals task is an adjusted version of the Animals in a row task (Levinson & Schmitt, 1993). This task addresses non-linguistic use of frames of reference by asking the participants to memorize an array of animals on a table. The participants are then turned around and are asked to reproduce the array. The way they reproduce the array can either be egocentric or allocentric. We include this task to

assess whether the linguistic strategies employed has non-linguistic cognitive correlates. Previous studies have shown that the linguistic and non-linguistic strategies correlate which suggests that the differences in linguistic strategies are not just superficial habits of language use but reflect deeper cognitive processes [e.g. Majid et al. (2004); (**???**); Li & Gleitman (2002); Gallistel (2002)).

To contextualize the linguistic and non-linguistic findings we relate them to the sociotopographic model (STM) proposed by Palmer et al. (2017). The STM is a model of the interaction between environment, culture, language use, and linguistic repertoire. The argument is that the spatial grammar of a language is influenced by the topography of the landscape in which it is spoken, but that this influence is mediated by the culture of the community. Since the four Nahuatl speaking communities are interspersed throughout diverse landscapes and different cultural contexts, it is an obvious candidate for a case-study of the nature of the sociotopographic model. If the language use and linguistic repertoire differs between the dialects, how can that be explained by sociocultural and environmental factors?

The language use and linguistic repertoire part of the STM is collected using the tasks explained above. To employ the STM we have collected a range of data to address the sociotopographic context of the communities. Parameters which have been shown to influence the use of spatial languages are age (e.g. Meakins, 2011), gender (e.g. Bohnemeyer, 2011; Le Guen, 2011), and occupation (Palmer et al., 2017; Shapero, 2017). These parameters are interrelated and most likely proxies for other factors. As an example, age is likely a proxy for contact with Spanish in Nahuatl, but also related to more schooling, more experience with driving a car etc. For this study, we have collected a range of sociolinguistic data including the standard sociolinguistic parameters (age, gender, occupation), but also included questions about habits of language use, degree of literacy, experience with driving, and questions about the environmental experience of the participants.

In the chapter we first present previous studies of spatial frames of reference in Meso America and the sociotopographic model. Thereafter, we present our results regarding what frames of reference are attested and which are preferred in the four dialects. We determine how any variation patterns regarding both sociolinguistic and dialectal parameters. In the end, we briefly discuss the results in the context of the sociotopographic model.

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