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Quasi-experimental Approaches in the Realm of Language Variation – How Language Production Tests Can Help Us to Better Understand Syntactic Variation

Abstract: This article deals with experimental settings in the realm of syntactic variation, more precisely with variation in possessive structures. Large-scale variationist linguistic projects such as SyHD (2017) and DiÖ (2017) emphasise the importance of implementing standardised research designs in the context of data acquisition of syntactic variation. However, using experiments in variationist linguistics is not self-evident. To cast further light on this area, we first discuss the explanatory power of results obtained by experiments in variationist linguistics. We then delve into the benefits of using Language Production Tests (LPT) in this particular field. We argue that computer supported LPTs ensure a high degree of control and comparability. They are particularly useful for gathering dense data on inter- and intra-individual variation over time. In this context, we will discuss the variation of possessive structures in the Viennese dialect in detail.

1 Introduction[1]

This chapter deals with experimental settings in the realm of language variation, more precisely with syntactic variation in possessive structures. Experiments are not unusual in linguistics. They are mainly used in psycholinguistics but one can also find this research design in other linguistic (sub)disciplines like in experimental pragmatics (cf. Katsos 2012; Noveck/Sperber 2004) or experimental phonetics and phonology (cf. Hayward 2000). The term 'experiment' is also used in quantitative sociolinguistics and variationist linguistics. It describes certain research designs which try to gather linguistic data with the help of controlled and standardised stimuli (cf. König 2010; Kristiansen 2010; Auwärter 2005). Even if standardised procedures are urgently needed to elicit a certain amount of variants of a target variable (cf. Kallenborn 2016; Kortmann 2010: 844 f.), using experimental designs in variationist linguistics and sociolinguistics is not the default case. Current large-scale variationist linguistic projects in German speaking countries, such as SyHD (2017) and DiÖ

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(2017), emphasise the importance of implementing standardised research designs in the context of data acquisition of linguistic variation (e.g. Kallenborn 2016). Such research designs are needed in order to adequately analyse syntactic, morphological and phonological variables on the basis of sufficient language (production) data, guaranteeing interoperability (cf. Cornips/Poletto 2005: 942). Furthermore, standardised research designs in the form of quasi-experimental settings not only offer an efficient way of gaining statistically relevant quantitative and comparable data but also enable the targeted testing of (some) factors that could influence the choice of specific variants. Thus, such settings are means for not only describing linguistic differences but also explaining them.

In a broader sense, an experiment can be defined as a research approach in which one or more independent variables are manipulated in such a way that the corresponding effects on a dependent variable can be observed. However, using experiments in variationist linguistics is not self-evident, even if we place variationist linguistics at the interface between the cultural and natural sciences (cf. Schmidt/Herrgen 2011: 13).

The main aim of this chapter is to discuss the explanatory power of results obtained by experiments in variationist linguistics and then to introduce a promising computer supported quasi-experimental method to gather data in this field. We call this quasi-experimental method Language Production Test (LPT). We argue that LPTs are sufficient and efficient means to record comparable (quantitative) data on inter- and intra-individual language variation.

This article is structured as follows: We first go into more detail concerning the overall concept of causality (2). Then we discuss the quality criteria for experiments that are applicable to variationist linguistics (3). From this, we conclude that we can use quasi-experimental methods in variationist linguistics. Subsequently, we introduce LPTs as a quasi-experimental method (4.1), which allows us to collect valid data on inter- and intra-individual language variation. This is exemplified by means of possessive structures in Viennese German (4.2). Finally, we offer a brief conclusion (5).

2 Causality

Causality is a heuristic tool that helps us to think about our environment, to organise our thoughts, to predict future events, and even to influence future events (cf. Jaccard/Jacoby 2010: 140). It is, however, a concept that is frequently misunderstood. A cause-and-effect relationship (causality) has to be clearly distinguished from correlation. Correlation suggests an association between two or more variables. Causality shows that one variable directly effects change in the other. Although correlation

may imply causality, it differs from a cause-and-effect relationship. A correlation can occur coincidentally, while causality cannot. By contrast, if an experiment shows that an outcome unfailingly results from the manipulation of a particular variable, researchers confidently assume causality, which can also be expressed in correlations. The study of causal relationships usually has the following characteristics (cf. e.g. Mumford/Anjum 2013; Psillos 2002): there is a) a variation of cause and effect, b) the possibility to manipulate the cause (intervention), c) temporal sequencing, d) an exclusion of alternative explanations, and e) embeddedness in theoretical assumptions. The characteristics b) and c) mainly concern the research design and are therefore methodological considerations. However, the possibility to find a causal link between two variables depends on the design, not on the statistical procedures used to analyse the collected data (cf. Jaccard/Becker 2002: 248).

The most common and efficient research designs to study causal relations, i.e. causal hypotheses, are experiments. However, in variationist linguistics researchers usually use descriptive and correlative hypotheses. This may be due to the nature of the complex object of investigation. Language variation can be influenced by so many interacting factors that it is impossible to control all of them. Even if we take effect sizes into consideration, it is extremely difficult for linguists to establish a causal link between two variables. Due to the complexity of language variation and change, it is also hard for linguists to meet the scientific quality criteria, namely: reliability, validity, and intersubjectivity. In the next section, we will go into more detail concerning the criteria and their meaning for variationist linguistics.

3 Experimental approaches in the realm of language variation

Valid, reliable, intersubjective and representative experiments are only possible if the different factors of the experimental arrangement are fully controlled. "Thus, the basic techniques of experimentation are techniques for securing control." (Kristiansen 2010: 530) However, there is both a theoretical and a practical problem with this. Assuming that language is a dynamic and complex adaptive system (cf. Bülow 2017; Ellis 2011; Beckner et al. 2009), we have to accept that language development and variation are non-linear processes (cf. Bülow/de Bot/Hilton 2017; de Bot/Lowie/Verspoor 2007) which are influenced by many interacting factors. Therefore, from a practical perspective, it is of course impossible to control all factors that affect language. The limited predictability of language variation and change is not due to inaccurate or false measuring instruments but rather to the fact that, for instance, socio-pragmatic factors (like register and (hidden) prestige) change simultaneously and interdependently. The entangled change of variables in linguistics complicates linking the

causal relationship between two variables, even when experimental settings are used. However, experimental settings help to meet those closely interconnected quality criteria mentioned above.

Given that language is a dynamic and complex adaptive system (cf. Bülow 2017; Ellis 2011; Beckner et al. 2009), it is of course difficult to obtain completely reliable results over time in any field of linguistics. Even in psycholinguistics, time is an essential factor, as neuronal networks not only differ from individual to individual but also from time to time. This is why developmental and experimental research should also be based on intra-individual data, and not only group data, over time (cf. Nelson/de Haan/Thomas 2006; Sporns 2010). Other big problems concerning the reliability of measurements in the field of variationist linguistics are human errors of measurement and the impact of confounding variables (cf. König 2010: 496). For instance, supposed isoglosses may show areas in which individual fieldworkers collected and interpreted this data themselves (fieldworker specific isoglosses) rather than showing boundaries between linguistic variants. Therefore, variationist linguists should reach out for high degrees of internal and external validity.

Both the internal and external validity are important quality criteria for the evaluation of experimental designs. Internal validity refers to the exclusion of alternative explanations for the observed relationships. Thus, internal validity is the "validity of conclusions about the causality of a relationship between two variables" (Shadish/Cook/Campbell 2002: 508). The central question is whether the change of a dependent variable is actually due to the assumed cause, i.e. the change of an independent variable. External validity refers to the generalisability of results over different persons, situations, contexts etc. Thus, external validity relates to conclusions concerning the existence of the causal relationship between different persons, situations, and different measurements of the variables (cf. Shadish/Cook/Campbell 2002: 507). There are some points that pose a challenge to internal validity in variationist linguistics. The search for control, for example, tends to destroy 'naturalness'. In contrast to psycholinguistics, variationist linguistics tries to collect 'natural' language data. In natural settings, we achieve a higher external validity – but we cannot control all possible factors. Furthermore, we deal with complex intra- and extra-linguistic factors in variationist linguistics such as context, education, prestige, etc. These factors are characterised by a multitude of features that are difficult to operationalise. In the demand to reach the highest degree of validity and reliability, the problem of representativeness is implicitly included. "A sample is representative if it reflects the characteristics of the population to be

investigated, if it represents a miniature image of the whole that is capable of supporting general conclusions about it." (König 2010: 498) Unfortunately, in variationist linguistics, it is seldom discussed how representative a recording of a person is in terms of linguistic behaviour. It should be noted that language variation and development is a non-ergodic process (cf. Bülow/Scheutz/Wallner 2019; Lowie 2017: 127–129). This means that inter- and intra-individual variation are not equivalent (cf. Molenaar 2004: 202). As is the case in psychology, development and change-related research should always be based on inter- and intra-individual data over time (cf. Nelson/de Haan/Thomas 2006; van Geert 2008; Sporns 2010; Bülow/de Bot/Hilton 2017). Hence, in variationist linguistics, recorded speech data must also be representative for the individual. The more data of persons we have over time, the sooner it is that valid generalisations can be made on inter- and intra-individual language variation in certain communicative situations (cf. Lowie 2017: 138).

In a nutshell, experiments in variationist linguistics cannot be experiments in the narrow sense (with full control over all variables). Normally, when we collect language data we do not have control over all variables, there is a strong impact of confounding variables and we seldom have control groups. Therefore, it is very difficult to establish a causal link between two variables. Even if we have, say, a certain degree of repeatability and comparability, the causal explanatory force is limited (cf. Kristiansen 2010: 530).

Nevertheless, in a broader sense an experiment is first and foremost a standardised research design in which at least one variable is manipulated in order to empirically obtain intersubjective language data and receive information about language assessments and attitudes towards language. Herewith, we refer to Campbell/Stanley (cf. 1963: 34) who speak of quasi-experiments when fundamental principles of experimental investigations are applied without satisfying all the relevant requirements. In the following we introduce a quasi-experimental method which allows a high degree of control and comparability: the Language Production Test.[2]

4 Language Production Tests

In the following, we discuss the use of LPTs to gather data on both inter- and intra-individual variation. While these tests are well established in psycholinguistics (e.g. picture naming tasks), they are still underrepresented in variationist

2 We prefer the term Language Production Test to Language Production Experiment (cf. Kallenborn 2016: 69 f.).

linguistics. We will show how LPTs can help to collect comparable language production data and will explain which kinds of LPTs are conceivable. Therefore, we will define the term, differentiate LPTs from other standardised methods, and give the means to classify various sorts of LPTs. Then we will explain how computer-supported LPTs are applied using a concrete example.

4.1 LPTs in variationist linguistics

An LPT is a standardised method to gather specific linguistic phenomena. With a focus on variationist linguistics,[3] we define LPTs as quasi-experimental settings which use standardised (often multi-modal) stimuli. These stimuli are used in standardised sequences evoking (spoken or written) language production data and thereby testing specific linguistic factors. In this definition, many different types of LPTs are conceivable.

In contrast to a written questionnaire, which is also a standardised survey method (cf. Cornips/Poletto 2005: 949), an LPT can control for more situational variables. Therefore, it can record and document language production data in a more intersubjective and reliable way. Oral questionnaires or interviews (cf. Edisyn 2012), on the contrary, are strongly influenced by the field worker and the limitations of the amount of information given orally for a task (cf. Cornips/Poletto 2005: 948). Since LPTs are able to repeat a task identically, they can guarantee a much higher degree of (inter- and intra-individual) repeatability.

Lastly, many surveys deal with spontaneous speech recordings respectively authentic written data. While these corpora are the most authentic language production data, they are less controlled for certain linguistic phenomena. Especially in the realm of syntactic variation, it has often been stated that the frequency of interesting syntactic phenomena is too low in such corpora for exhaustive comparative analyses (cf. Lenz 2008: 163; Seiler 2010: 513; Kallenborn 2016: 65).

Thus, it is hardly surprising that LPTs were developed and used in studies and projects to survey syntactic variation (cf. Lenz 2008; Kallenborn 2016; Breuer 2017; DiÖ 2017; SyHD 2017). For these LPTs, it is characteristic that they use multimodal stimuli in a standardised way. Furthermore, the stimuli are presented in a standardised sequence in each task. Thereby it is important

3 We define LPTs based on their concrete structure and set-up. However, in quantitative sociolinguistics there is a long tradition of 'quasi-experimental' settings, which are classified more by their purpose than by their means (cf. Auwärter 2005).

that various stimuli of one and the same task[4] must be presented in the same, controlled order and over a defined duration of time. Usually there is more than one task in an LPT since a test is designed to compare the effects of (at least some) factors, thus providing the possibility of intra-individual comparability. Tasks can differ in their degree of openness, meaning that they can be designed as more open (requests or questions) or more closed (cloze tasks) assignments, as shown in Figure 1.

Figure 1: Examples for degree of openness in different tasks (transl. LMB)

Type	Example	Source
request	'Describe as exactly as possible what the man is doing in the following video'	Breuer (2017: 96)
questions	'What is happening to the man in the video?'	Lenz (2008: 159)
cloze task	'This is used for …'	Kallenborn (2017: 129)

A more open task is less suggestive and more authentic, while a more closed task leads to more desired responses (e.g. expected variants) and to lower naturalness. At the same time a more open task leads to longer responses or to undesirable ones.

Usually, the tasks are digitally displayed as multi-modal stimuli. While in some LPTs computers can only be means for presenting the tasks (e.g. Lenz 2008; Kallenborn 2016), we suggest that only LPTs which use experimental software (e.g. Breuer 2017; DiÖ 2017) like OpenSesame (http://osdoc.cogsci.nl/) or SpeechRecorder (http://www.bas.uni-muenchen.de/Bas/software/speechrecorder/) should be considered as being 'computer supported'. Experimental software controls the exact procedure and protocols the whole experimental setting – which also makes it possible to omit the field worker from conducting the experiment. In addition, using experimental software is an easy way to (pseudo-)randomise task order. In a nutshell: a higher degree of automation of an LPT leads to a higher degree of standardisation and thereby a higher experimental character of the setting as a whole.

Lastly, an LPT can have different goals regarding different groups of informants and informant related variables. They can be used to compare intra- and inter-individual variation (cf. Kallenborn 2016: 69), meaning that an LPT can be used

4 If the particular stimuli of one task are presented in a different order, it would be considered a different task.

to compare data between e.g. different groups of informants or to compare the linguistic responses of an individual to the same stimuli over time.

As mentioned before, it is impossible to control all interacting factors. But we can at least control some of the variables in terms of manipulating the linguistic factors of which we are aware. Taken together, LPTs are experiments in a broad sense. They provide a standardised and comparable method to gather language production data. Furthermore, they help to record 'control groups'. In order to provide more insights into LPTs, the next section presents an LPT design for eliciting possessive structures in different settings.

4.2 LPT example: possessive structures in Viennese German

The following example is taken from the LPT design of Breuer's dissertation project (described in Breuer 2017) and illustrates a computer supported LPT (Figure 2). This specific task set is, among other things, designed to elicit possessive structures. This phenomenon is one of eleven syntactic phenomena which are conducted as dependent variables in this particular LPT. Breuer's LPT consists of two runs, each comprising 70 tasks: one run aims at (intended) standard varieties (LPT-s) and one at (intended) Viennese dialect varieties (LPT-d) (termini see Glauninger 2012: 111). So, one of the tested independent variables is the speech level and the intended variety respectively. These two runs were conducted at two separate meetings to avoid recognition effects and to provide different situational settings: a more formal and a more informal one. LPT-s runs were conducted in the first recording session after a formal interview. The explorer and the informant did not know each other and spoke to each other on a last-name-basis ('per Sie'). The LPT-d runs, on the other hand, were conducted in a second meeting after an informal 'talk among friends', a survey method in which two informants talk to each other in the absence of the explorer. The informants already know each other or at least represent the same social group, which leads to a more informal situation. Furthermore, while the LPT-d runs were conducted, the explorer and the informant talked to each other on a first-name-basis ('per Du'). The LPTs were conducted with 32 informants, all of whom were born and raised in Vienna. To increase the naturalness of the data, the LPTs were conducted in the field, meaning in a natural environment (here, the home of the informant or in the second meeting the home of his/her friend).

Figure 2: Example for LPT setup

We do not want to go into too much detail concerning the syntactic phenomenon[5] but rather illustrate the method of its realisation and at least some of the linguistic factors we tested in this context. Possession structures in German are described prototypically as an inanimate object (possessed (PD)) in the possession of an animate entity (possessor (PR)). From a linguistic perspective, however, kinship can also be defined as possession relation (e.g. Kasper 2017; Foley 1997: 131–149), although this notion is semantically rather unusual. Furthermore, an inanimate entity (independent of the animacy of the PD) is very seldom a possessor. However, depending on the anthrophomorphology of the entity, a more human-like inanimate entity, e.g. a doll, is rather seen as a potential PR than a prototypical object, like e.g. a ball (see Kasper 2017, 2015a, 2015b). Therefore, it is postulated, for German varieties, that the different degrees of animacy of the

5 For possessive structure in German dialects, see Kasper (cf. 2017) and Weiß (cf. 2012). Also see: Zifonun (cf. 2003), Demske (cf. 2001), and Heine (cf. 1997).

PR and the PD influence the choice of specific variants. In this survey all PR-PD-relations, independent of their degree of animacy, are analysed. Therefore, possession is semantically rather seen as affiliation which in our opinion describes the kinship-relation much better than possession. A second, more syntactical factor on possessive structures in German varieties is the nominal realisation of the PR: proper names more often appear with different genitive variants, namely pre-nominal genitives, in comparison to other nouns which are preferably realised as post-nominal genitives (see Kasper 2017, 2015b; Demske 2001). Considering those factors as well as the basic thesis that informants use different variants according to the intended speech level (standard vs. non-standard varieties), three task-sets where conducted in the two LPT runs. Each task-set, in turn, consists of different tasks. These tasks are repeated in a very similar way, e.g. only dealing with different activities ('to greet', 'to talk', 'to give'), or slightly different entities. This allows a detailed description of inter- and intra-individual variation due to the several linguistic and extra linguistic factors. Figure 3 provides an overview of the different linguistic factors which were tested:

Figure 3: Task sets and tested linguistic factors

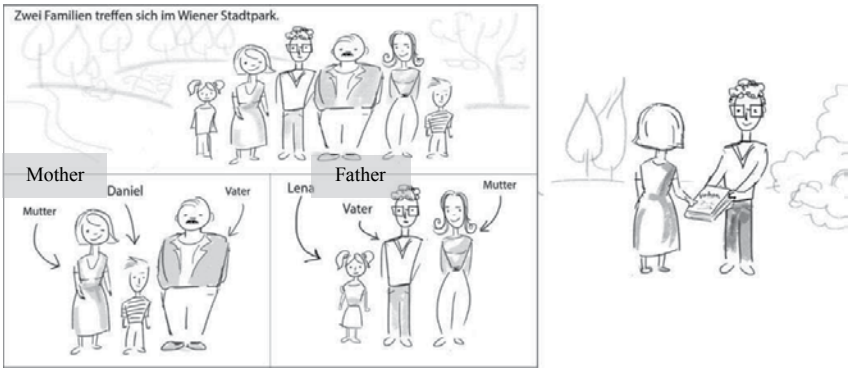
	Set 1 ('The Thief')	**Set 2 ('Family Affairs')**	**Set 3 ('Remote Control')**
PS	animate proper name	animate proper name	inanimate common noun
PD	inanimate	animate	inanimate
typical possession	+	+/-	–
tasks & media	4 tasks – video	6 tasks – picture	4 tasks – picture

Each linguistic factor (task-set) was testes in two runs as described above. In what follows, we explain one task of the LPT-s (standard stimuli) and one task of the LPT-d (dialect stimuli) from the task-set 'family affairs' to depict how intra-individual and intra-situational comparability is achieved. Note that the LPT-s stimuli as well as the LPT-d stimuli consisted of recordings of competent Viennese speakers.

In LPT-s, informants are first shown Figure 4; they then hear the task in Standard German: 'Describe as exactly as possible what you see in the image. In doing so, say who is doing what'.

Figure 4: LPT-s

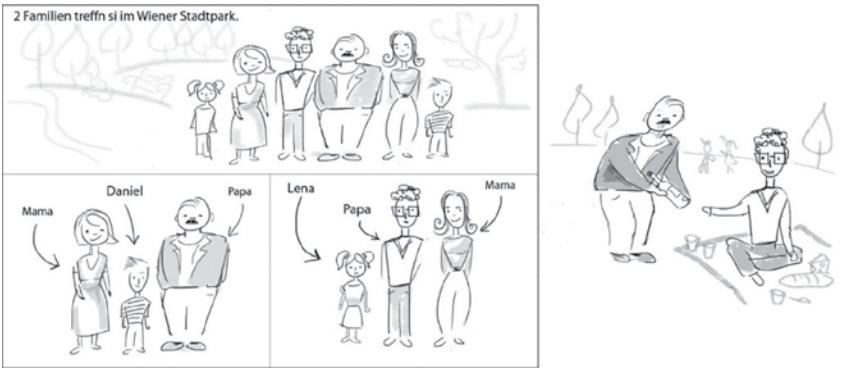
'Two families meet in the Vienna City Park'



Answer (1) (see below) shows two standard conformable pre-nominal genitive constructions given by an informant.

In LPT-d, informants are shown Figure 5, which is similar to Figure 4 but avoids repetition effects in changing details which are assumed to be irrelevant for the choice of the syntactic variants. The informants hear the same instruction, but in Viennese dialect.

Figure 5: LPT-d

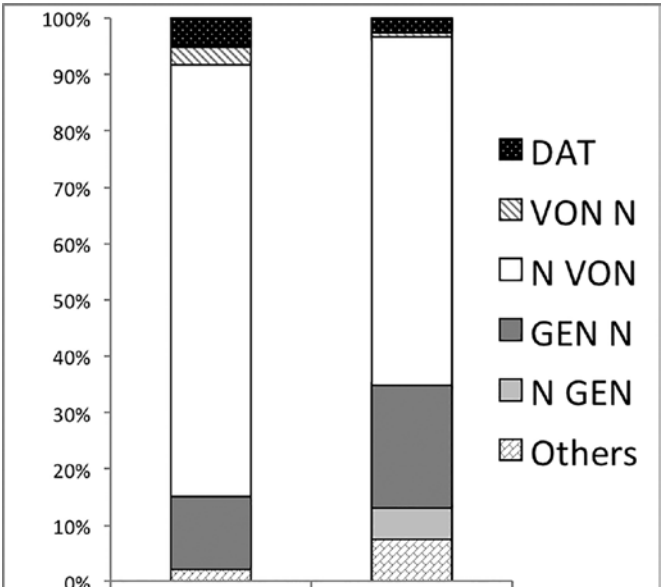


(1) *Lenas Vater gibt Daniels Mutter ein Kochbuch* (DS)
Lena's father [GEN N] gives Daniel's mother [GEN N] a cookbook.

(2) *Der Papa vom Daniel gibt dem Papa von der Lena eine Flasche Wein im Stadtpark.* (DS)
The father of [DAT] Daniel gives the father of [DAT] Lena a bottle of wine…

As the variety (standard vs. nonstandard) used in the stimulus might influence syntactical structure, the informant may use the genitive-construction, as shown in (1), or the *von*-construction, as shown in (2). Figure 6 shows the frequency of the different possessive structures expressed in all the possession-tasks and task sets in the two runs.

Figure 6: Frequency of different possessive structures per run in % and absolute values (n=498)

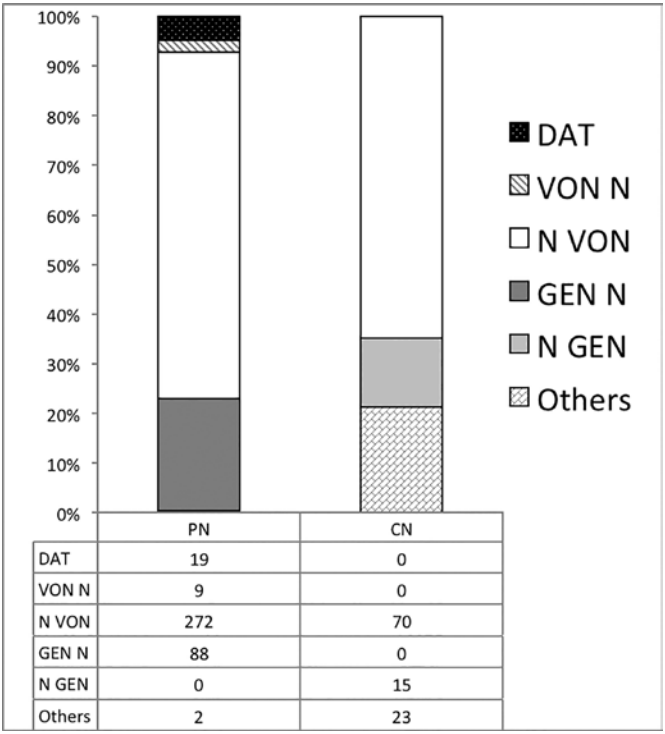


	LPT-d	LPT-s
DAT	12	7
VON N	7	2
N VON	177	165
GEN N	30	58
N GEN	0	15
Others	5	20

Compared to LPT-d, an increase in the usage of genitive constructions and a slight decrease of possessive dative variants can be noted in LPT-s. The pre-nominal

genitive construction only occurs in the LPT-s. This confirms the influential force of the more informal, respectively more formal settings (cf. Lenz 2003; Scheutz 1985). Notably, the *von*-construction is the most used variant in both runs. It can be assumed that the *von*-construction is the default variant. Its frequency of use is not dependent on the intended variety of the two runs (see Kasper 2017). Furthermore, by conducting such tests, we can check the tested linguistic influence factors, e. g. the mentioned influence of the noun which represents the PS: a proper name or a common noun (see Figure 7).

Figure 7: Frequency of different possessive structures with proper names (PN) or common noun (CN) as PS in % and absolute values (n=498)

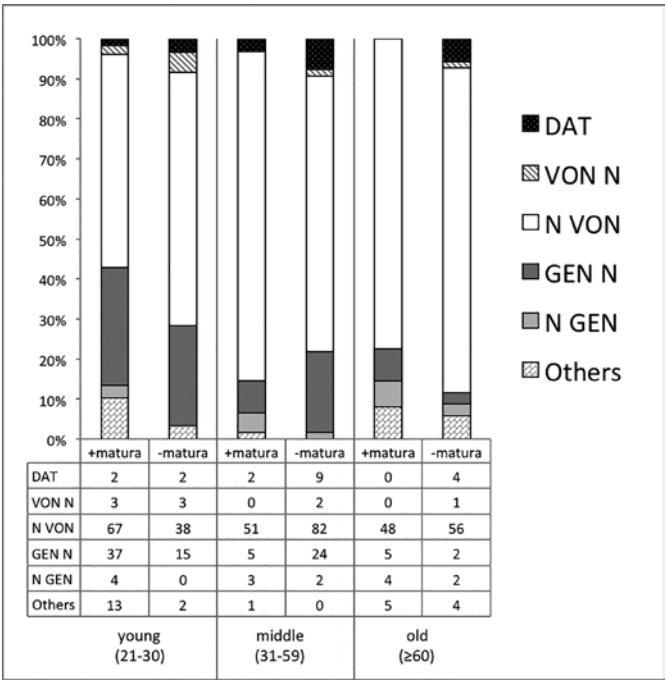


	PN	CN
DAT	19	0
VON N	9	0
N VON	272	70
GEN N	88	0
N GEN	0	15
Others	2	23

As expected, the pre-nominal genitive only occurs with proper names, the post-nominal genitive only with common nouns. Again, the *von*-construction appears to be suitable for both noun classes. In this manner, the tested factors can be observed in the data elicited by the LPT-s.

Using LPTs allows us to look at the intra-individual variation as well. While Figure 8 shows the basic inter-individual variation on a more sociolinguistic level, Figure 9 displays an example of an intra- and an inter-personal analysis of the middle-aged informants. Thereby, this intra-individual analysis is more detailed and enables a differentiated look at the data without presupposed (sociolinguistic) categories.

Figure 8: Frequency of different possessive structures per group of informants in % and absolute values (n=498, +/-matura stands for the qualification for university entrance in Austria)

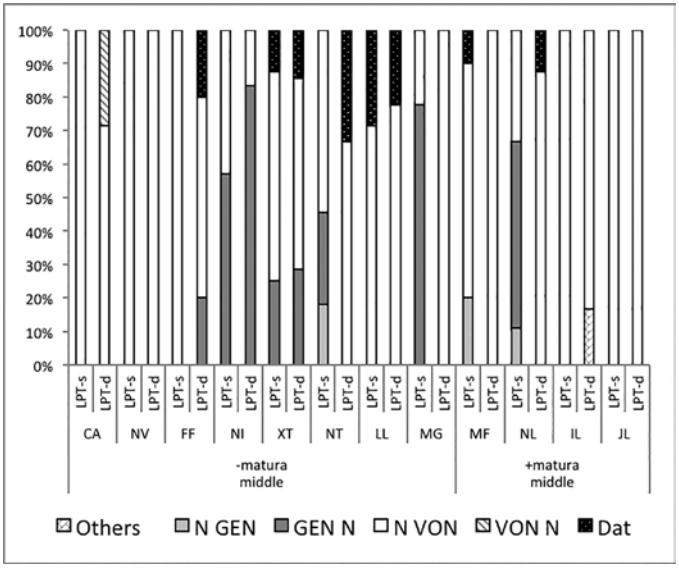


	+matura	-matura	+matura	-matura	+matura	-matura
DAT	2	2	2	9	0	4
VON N	3	3	0	2	0	1
N VON	67	38	51	82	48	56
GEN N	37	15	5	24	5	2
N GEN	4	0	3	2	4	2
Others	13	2	1	0	5	4
	young (21-30)		middle (31-59)		old (≥60)	

The inter-individual comparison between the three groups of informants in Figure 8 shows the status of the dative variant: the frequency of genitive constructions, which is expected as a standard-conform variant, decreases from about 29 % for the youngest informants with Matura to about 3 % for the oldest informants without Matura. People with a higher education level seem to avoid non-standard variants, in particular the older informants. Notably, the middle-aged group defies the trend; the informants without Matura are the

most dynamic one's using the dative variant as well as the pre-nominal genitive variant frequently.

Figure 9: Frequency of different possessive structures per person and run in % (middle-aged group, n=181)



Each bar represents the frequency of occurrence of certain variants per run by each informant. Figure 9 shows speakers who do not vary, using only one variant (NV, JL, IL), with some preferring one variant (NI, LL) in both runs. The others are so-called "switchers", using different variants depending on the run (LPT-s vs. LPT-d). As Figure 9 shows, especially informant NI uses the pre-nominal genitive construction in both situations disproportionately often as a default variant, while informant MG uses it as the preferred variant only in LPT-s.[6] Given the high complexity of the vertical variation of syntactic phenomena, we hope that this case study is able to demonstrate the advantages of using LPTs in variationist linguistics.

6 An explanation could be provided by a qualitative analysis of the interview data which is also conducted in this project since it surveys language attitudes.

5 Conclusion

Despite the fact that it is very difficult to identify causal relations between two variables in variationist linguistics, we have argued that a broad conception of the term experiment is useful to describe particular research designs. We defined quasi-experimental settings as standardised research designs in which at least one variable is manipulated in order to empirically obtain language production data and receive information about language assessments and attitudes towards language. In this sense, we have introduced Language Production Tests (LPTs) as quasi-experiments, which ensure a high degree of control and comparability. Furthermore, we demonstrated that LPTs are particularly useful for gathering data on syntactic phenomena over time. These data are suitable for a quantitative analysis. Regarding possessive structures in German varieties of Viennese informants, we could show that LPTs can control for several linguistic and extra linguistic factors.

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