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> "Bilingualism, code choice, and identity: a sociolinguistic survey of peer-to-peer interaction at Vienna Bilingual Schooling"

Verfasser<br>Claudio Schekulin

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## 1 INTRODUCTION

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### 1.1 Factual preliminaries

The following study, "bilingualism, code choice, and identity: a sociolinguistic survey of peer-to-peer interaction at Vienna Bilingual Schooling," is based on an empirical research project carried out in the period March to June 2007 at two bilingual high schools, both of them located in Vienna. The two schools are run under the auspices of Vienna Bilingual Schooling, a program designed to offer German-English bilingual instruction at publicly-run schools under a standard Austrian curriculum.

Since its inception in 1992, the program has expanded to comprise classes at all levels of primary and secondary education, with an overall student population of approximately 2,300 at more than fifteen different schools (Simpson: personal communication). ${ }^{1}$ Vienna Bilingual Schooling caters to a linguistically diverse student body, and instruction is provided by teachers qualified either in accordance with the Austrian standard, or that of an English-speaking country. The professed aim of the program is to provide an education that is both bilingual and multicultural, yet at the same time meets all the formal requirements of public schooling in Austria. As such, the schools within the system are tuition-free, which distinguishes them from other internationallyoriented schools in Vienna.

[^0]The specific population selected for this survey were students at the uppersecondary level, i.e. those enrolled in grades nine to twelve (or thirteen). ${ }^{2}$ Data on the students' linguistic behavior was gathered through the administration of written questionnaires to a large number of them, as well as through observation and interviews with select groups and individuals.

### 1.2 Aims and scope

The core ambition of this study is to establish patterns of code choice in informal conversations among members of the target population, viz. students enrolled in the upper-secondary level of Vienna Bilingual Schooling. In particular, the discussion will center on significant correlations between language choice, a (macro-)linguistic variable, and the various social factors constitutive of the interactions. Thus, the study follows in the tradition of sociolinguistics, and space will be given to a brief survey of this branch of research and some of its more general methodological issues (section 2.2.1). A separate section (2.2.2) will, in more detail, discuss sociolinguistic models of code choice.

Code choice, however, cannot be meaningfully understood without reference to the larger social ecology of bilingualism itself. Indeed, it has been suggested that code switching and code choice are "[p]erhaps the central issue[s] in bilingualism research" (Milroy \& Muysken 1995: 7). Any conclusions we draw from an analysis of code choice must therefore be formulated against the backdrop of a more comprehensive theory of bilingualism. In consequence, section 2.1 attempts to give a rough overview of research into bilingualism, a task necessarily fraught with difficulties given the vast amount of published material on this subject that has accumulated over recent decades. Following a common subdivision, I will first discuss cognitive aspects of bilingualism (section 2.1.1),

[^1]followed by section 2.1.2 on societal aspects of bilingualism. A final section will be dedicated to bilingualism in education (2.1.3), because of this subject's salience within the context of my study.

A third theoretical anchor in my project is provided by the concept of identity. Identity as an explanatory construct has gained currency among sociolinguists in the recent past (Auer 2005: 403), and I will briefly survey how the concept has been understood in the literature of the field (section 2.3). As with all the other concepts and theories presented, I will explain in which ways I expect them to relate to the data of my particular study.

Briefly recapitulating, the three theoretical foci of bilingualism, code choice, and identity will be discussed in this order in section 2 of this study. Section 3, in turn, will present the empirical part of my project. Space in this section will be devoted to some of the major methodological issues implicated in the field work, followed by the quantitative analysis of my data. I conclude the section with a discussion of the results in light of some of the qualitative data.

Section 4 will reflect on the conclusions reached in the preceding segment, with a view to situating them in the global context. Bilingualism, and I will elaborate on this point further in an instant, is a pervasive cultural phenomenon; and the English language - due to its dominance and spread - plays a preeminent role in many contemporary manifestations of it. An assessment of the significance my data might have with regard to wider sociolinguistic developments shall round out the argument of this study. A brief concluding section (5) will pull together the various strands of my argument and summarize the main findings.

While much will be said about social and social-psychological dimensions of code selection in the pages to follow, it is beyond the scope of this paper to discuss linguistic-grammatical constraints on code switching, or any intralinguistic implications of language contact. It is important to note that a different
methodological approach would have been required for such an analysis, and that investigating these issues was not part of the motivation behind this survey.

Similarly, in terms of the phenomena to be investigated, the focus lies on informal speech, and thus explicitly excludes classroom interaction as a concern. The institutional setting of Vienna Bilingual Schooling will be elaborated on insofar as it forms the wider context in which my data is situated. It is not my aim to cover in any detail pedagogical issues of bilingual education in general, or its specific implementation at Vienna Bilingual Schooling in particular. Rather, my desire is to shed light on the sociolinguistic dynamics underlying informal verbal interactions, and to analyze the resulting patterns in relation to certain models of code selection and bilingualism. The orientation of my research is thus decidedly descriptive in nature. Nevertheless, I am confident that a study in this vein can contribute to a better understanding of the overall impact of bilingual education on students' lives, especially if we subscribe to a holistic view of education, in which performance and outcomes are not assessed merely on the basis of (standardized) tests, but in terms of the impact on the personality and identity of learners.

### 1.3 Rationale

Several studies have dealt with Vienna Bilingual Schooling since the program's inception in the 1990s. The one of these started earliest, by Peltzer-Karpf \& Zangl (1997), provides a longitudinal analysis of linguistic achievement in the second language by elementary school students after four years of bilingual instruction. ${ }^{3}$ Both Hüttner (1997) and Gräll (1999) are much wider in scope and closer to this study in outlook, as they address such issues as code switching and code choice. Hüttner (1997: 160ff) uses observational data and target-language

[^2]experiments to establish patterns of code choice in an elementary school setting. She concludes that German is the dominant language in the context she studied, owing to the dual forces of language proficiency and social environment. Gräll (1999: 132ff) relies on interviews and observational data to study code choice at a lower secondary school participating in the program. Her data again show a gravitation towards German as the preferred language of informal interaction, except among native speakers of English. Reasons for this are to be found in the self-reinforcing nature of linguistically-based social networks, according to Gräll (1999: 139).

As is apparent from this synopsis of previous research, the sociolinguistics of code choice at the upper-secondary level of Vienna Bilingual Schooling has not yet been addressed in the literature, and it is hoped that this study will complement earlier surveys in this regard. Like both the studies of Hüttner (1997: 82) and Gräll (1999: 104), this study will employ a compound methodology of observation and quantitative measurements. However, the different age of the respondents allowed the use of detailed questionnaires as the main data-gathering procedure, an approach which was deemed infeasible or was rejected by school authorities in previous studies (Gräll 1999: 104). Moreover, my focus will lie on issues of identity and group dynamics, since language proficiency as a factor in code selection must be surmised to recede in importance after several years of bilingual education. This assumption is supported by the slightly different explanations put forward by Hüttner (1997: 164) and Gräll (1999: 139) in their studies of code choice at the elementary and lower secondary levels, respectively.

Apart from its situatedness within the immediate context of previous research, the rationale of this study can also be explained with reference to the larger body of work on bilingualism of recent years. If we look at research on English bilingualisms, especially studies in a sociolinguistic vein, most of them come
from either of two overarching contexts: immigrant communities in English-speaking countries or post-colonial settings. Viewed within Kachru's (1992: 356) circle model of English, those two settings would represent the inner and outer circles of international English. Much less frequently, however, do we find studies that deal with the expanding circle (cf. Berns 2005: 85). ${ }^{4}$ In a way, this is not surprising, given that the expanding circle is characterized by a lack of sustained use of English at the local level. Yet as Berns (2005: 85) correctly argues, it is precisely in this arena that we have witnessed a marked change in recent years, with English acquiring a status and frequency of use in these localities which far exceeds the one it had when the model was first formulated. I would like to postulate that Vienna Bilingual Schooling is in some ways at the forefront of this development, and might therefore be a fitting laboratory that allows for the study of the developing bilingualism(s) within the simplifying bounds of an institutional setting. Certainly, there are arguments that speak against this view. The fact that some of the students and teachers at Vienna Bilingual Schooling are native speakers of English could be construed as one of these, advocating instead that the setting be studied in traditional cross-cultural terms. However, the key role that expatriate native speakers from core countries originally played in what became the outer circle seems to significantly moderate this objection. The fact that relatively few speakers from true core countries were found in the student population of Vienna Bilingual Schooling in the earlier studies of Hüttner (1997: 103ff) and Gräll (1999: 117ff) further supports the argument.

What, then, might the underlying differences be in the sociolinguistic situation of English in the expanding circle compared to more extensively studied

[^3]contexts? For one, the focus on post-colonial locations and immigrant communities has had the effect that most of these settings
involve [..] the use of a state-supported and powerfully legitimated language [English] in opposition to a stigmatized minority language that has considerably less institutional support. (Gal 1988: 247)

Similarly, well-publicized early studies of bilingualism and code choice in predominantly German-speaking countries, viz. Gal (1979) and Auer (1984), likewise deal with an authochthonous linguistic minority on the one hand, and an immigrant language on the other, which in both cases have to vie against the dominant German language. German-English bilingualism in Austria differs from all these settings, since the two languages encountered here do not easily fall into the fold of the dominant-versus-stigmatized dichotomy. Forms of bilingualism which do not conform to this pattern have been referred to as instances of elite bilingualism (Romaine 1995: 25), and at least implicitly there has been an implication that these forms of bilingualism are somehow of less concern in sociolinguistics. If we wish our studies to have immediate social or political impact, this focus is understandable (cf. Gal 1988: 247). Yet as Hammersley (1992: 127) argues, immediate social impact is generally too strict a criterion for the overall relevance of social research. Rather, the spread of English in expanding circle countries is an important social development, so it certainly merits study from a sociolinguistic point of view. Additionally, the complexity of contemporary society and its globalized networks arguably renders it increasingly difficult to substantiate any clear demarcation between involuntary and elite forms of bilingualism. Furthermore, studying bilingualism in its many guises can help to refine the theoretical precepts, concepts, and constructs of the field. A selective abstract of the development and state-of-theart of this scientific framework will be the topic of the following sections.

2 CONCEPTS, MODELS, THEORIES<br>anoutline of the<br>scientificframework

In his seminal essay on the process of scientific progress, Kuhn (1970: 35) suggests that the overwhelming bulk of research activity is characterized by concerns quite limited in scope, arcane in detail, and largely accepting of the established theoretical underpinnings of the field. Research within this paradigm, he argues, cannot - by definition - be revolutionary. It instead allows for a steady but incremental refinement of scientific models. While in very broad terms, Wray, Trott \& Bloomer (1998: 8) envisage a similar procedural approach for work in (socio-)linguistics, it is probably fair to say that - unlike in the natural sciences, which Kuhn is primarily concerned with - in the social sciences the paradigm is generally less constricted. That is to say, a number of competing models, theories, and explanatory approaches might hold sway in the research community at any given point in time. ${ }^{5}$ As a result, the social researcher has the option to draw on a relatively wide array of concepts, models, and theories. It therefore falls to the researcher to select those which to her or him appear most promising in any given context. In the ensuing sections, I would like to present those scientific frameworks which in my view are best suited to my empirical data. The first sub-section will deal with bilingualism, more specifically its psycholinguistic (2.1.1) and social aspects (2.1.2), and bilingual education (2.1.3). The second sub-section will deal with issues of language variation more generally (2.2.1), as well as research into code choice more

[^4]specifically (2.2.2). The final section (2.3) will give a brief overview of how the concept of identity has been understood and used in the sociolinguistic literature. In each instance, I will summarize some of the central research in the field, and at the end suggest the ways in which I see the various frameworks as applicable to my own research.

### 2.1 Bilingualism

As any quick query of a university library's catalog or a standard scientific database will reveal, research into bilingualism has undergone exponential growth over the later decades of the twentieth century and into the new millennium. This raises the question why particularly this branch of research has witnessed such dynamism in the recent past. The phenomenon of bilingualism in itself is, after all, neither novel nor so subtle as to be easily overlooked by linguists. Mackay (1967: 13; similar argument in Grosjean 1982: vii) provides a crude, but quite illustrative analysis of the extent of bilingualism when he compares the number of nation states - one of the prime units of modern political and social organization - to the number of languages spoken in the world. Bilingualism, he concludes, is a pervasive factor of social life; and as Romaine (1995: 10) points out, the extent of bilingualism can only be assumed to have increased since these earlier assessments, in line with new possibilities in travel and communications (the decline and even death of small indigenous languages notwithstanding). More difficult to assess is the question of exactly how many people speak more than two languages, yet here, too, Baker (2006: 68) estimates that probably a majority of the world's population falls into this category.

Why, then, was it that until the middle of the twentieth century bilingualism was "never [...] central to any of the sciences which ha[d] studied the
phenomenon - sciences such as sociology, psychology, and linguistics" (Mackey 1967: 11)? The answer to this question might lie in the fact that unilingualism was generally a hallmark myth and guiding principle of nineteenth century European nationalism. ${ }^{6}$ Given the unmistakable links between the development of modern Western academia and the ideology of nationalism, it is not surprising that phenomena related to bilingualism were relegated to a peripheral status in much of early linguistic research (cf. Auer 2007: 320). If discussed at all, bilingualism, especially early childhood bilingualism, was mostly portrayed in a negative light, highlighting purportedly negative correlations between this form of bilingualism and intelligence, an assumption so widespread it is termed by Baker (2006: 143) the "historical (and hysterical) deficit viewpoint" [parenthesis and bold: original] (cf. Mackey 1967: 50, Romaine 1995: 107ff). Even where more positive attitudes towards bilingualism prevailed, these were usually linked to extremely restrictive definitions of an 'ideal', or 'proper' bilingual, who was supposed to possess "native-like control of two languages" (Bloomfield 1933: 56).

As interest in the phenomenon rose among the research community, the earlier postulated detrimental effects of early childhood bilingualism were challenged often being later linked to flaws or biases in the original research designs (Lambert 1962 [1972a]: 116, Mackay 1967: 51, Penfield \& Roberts 1959: 255). Likewise, Bloomfield's definition was challenged on its implicit insistence on a monolingual norm, a point of view ultimately untenable in the eyes of many. Thus, Skutnabb-Kangas (1984: 38) points out that, if applied roughshod to any and all aspects of human verbal ability, the definition is insufficient simply on the grounds that there is variability with regard to monolinguals' competence in areas such as the range of their vocabularies or the breath of registers they command. Put differently, just as the idiolects of monolingual speakers are shaped by their social experiences, so the competences of bilingual speakers are a

[^5]natural function of the environments in which they acquire and use their languages. To require total symmetry between the two linguistic systems would thus be an unreasonable threshold in defining the phenomenon - a threshold very much ajar with the social realities of being bilingual. Myers-Scotton (2006: 37) reasons among very similar lines, arguing that the specific linguistic repertoire of bilingual speakers is defined by the social work that the various languages have to perform for them.

As a result, a much more inclusive definition of bilingualism was formulated by Weinreich (1953 [1970]: 1), for whom it is the "practice of alternately using two languages". Much of contemporary sociolinguistic research has found it practical to adopt a similarly broad definition of the term (cf. Mackey 1967: 12, Romaine 1995: 6, Myers-Scotton 2006: 2-3, Baker 2006: 8). Mackey (1967: 12) observes that the definition of bilingualism broadened as the phenomenon became more widely studied. This is not surprising, given that the surge in interest in bilingualism was concomitant with the rise of sociolinguistics (cf. section 2.2.1), a discipline concerned with variation in language. Naturally, such a science has little to gain from too narrowly circumscribing the object of investigation. However,
adopting a functional definition of bilingualism (the regular use of two languages) [should not make us shy away from] the very complex question of describing a person's bilingualism. (Grosjean 1982: 230)

The following three sub-sections on bilingualism on the individual level, social aspects of bilingualism, and bilingual education are intended to give an overview of major strands of research into the phenomenon.

### 2.1.1 COGNITIVE ASPECTS OF BILINGUALISM

Taxonomies of bilingualism along cognitive, or psycholinguistic factors are almost invariably linked to patterns of language acquisition. By extension, many of them depend on one of the most fundamental theories in the field, the critical period hypothesis. While highly influential, the hypothesis does have its limitations, and as a result so do many of the terms in bilingualism research which rely on it (cf. Singleton \& Ryan 2004: 116; Hyltenstam \& Abrahamsson 2000: 162).

A critical period for language acquisition is first sketched out in Penfield \& Roberts (1959: 235), while Lenneberg (1967: 179) elaborates the concept and coins the term. In short, the critical period hypothesis postulates that natural language acquisition is only possible until a certain age, which Lenneberg (1967: 178) identifies as the onset of puberty. A reduction in brain plasticity, i.e. certain physiological changes in the brain, are diagnosed as the cause for the reduced ability of adults at internalizing linguistic systems (Penfield \& Roberts 1959: 240, Lenneberg 1967: 158).

Later studies have sometimes preferred to speak of sensitive or advantageous periods (Hamers \& Blanc 2000: 74, Baker 2006: 128), thus presenting a more nuanced view of the original hypothesis in the following two regards: first, they point to the fact that cutoffs are rarely categorical, and that it is possible to approximate the native speaker model of a language later in life. Thus, some research suggests a gradual decline rather than an abrupt collapse in the ability to acquire a second language (Hakuta, Bialystok \& Wiley 2003: 31). A central question here is whether acquisition outside the sensitive period is qualitatively different from acquisition within the sensitive period. The still very incomplete picture cognitive linguistics has of the actual micro-level processes underlying our linguistic abilities means that "the [cognitive] nature of near-native linguistic
competence ${ }^{[7]}$ remains to be determined" (White 2004: 254). The second important refinement inherent in the term sensitive periods is represented in its plural, meaning that there are most likely different periods corresponding to different aspects of language competence (Skehan 1998: 228). For instance, acquisition of perceptual phonology has been traced as far back as the pre-natal stage (Boysson-Bardies 1999: 26), and is certainly well on its way towards the end of the first year of life (Kuhl et al. 2006: F18). Together with the relatively few late learners who exhibit native-like pronunciation (Bongaerts 1999: 133) this could be argued to support the idea that the maturational window for phonetics and phonology closes relatively early compared to other aspects of linguistic competence. After a thorough survey of the literature, Baker (2006: 129) nevertheless concludes that questions as to when exactly the advantageous periods for particular linguistic skills close have not yet been adequately answered.

Based on assumptions about critical or sensitive periods in language acquisition (their limitations notwithstanding), a common categorization in bilingualism research distinguishes simultaneous bilingualism ${ }^{8}$ from successive / consecutive / sequential bilingualism (Grosjean 1982: 179, Romaine 1995: 181, Baker 2006: 120). In the former case, the two codes are acquired simultaneously in early childhood, and thus well within any sensitive periods. In the latter instance, a mother tongue is acquired in early childhood, and a second language at some point later in life. However, the limitations and unsettled questions with regard to the critical period hypothesis naturally carry over to this typology, meaning that sequential and consecutive bilingualism might by quite hard to distinguish phenomenologically in some cases. At the same time, instances of consecutive acquisition can lead to a wide variety of different outcomes, and even simultaneous acquisition in early childhood can manifest itself in various forms

[^6]later in life, based on the status of the two languages in the wider community (Romaine 1995: 187). In consequence, Grosjean (1982: 193) cautions against any simplistic equation of the simultaneous-sequential dichotomy with the degree of of person's bilingualism. Thus, attrition of skills in a native language is possible, even up to the point of language loss (Baker 2006: 130). Conversely, there can be high attainment in a second language in the presence of high levels of instrumental, but especially integrative (i.e. social) motivation (Baker 2006: 132). Therefore, if one strives to gain a fuller picture of the bilingual individual, one has to take into account emotive and attitudinal components in addition to such factors as age of onset or context of acquisition. Moreover, the discussion demonstrates how tightly intertwined the individual and social aspects of bilingualism are: after all, language acquisition - which we have so far used to define different cognitive types of bilingualism - is by necessity as much a social process as it is a mental one.

To forgo this dependence on external, social factors in describing a person's bilingualism, there has sometimes been a desire to directly measure linguistic dominance, i.e. to establish which of the codes is more easily processed mentally, or if indeed the bilingual is balanced in this regard. Lambert (1956 [1972b]: 29) offers a test based on the speed of response to certain linguistic stimuli, and Romaine (1995: 18) provides a survey of similar research over the following decades. However, Baker (2006: 35) concludes that most of these tests gauge very restricted aspects of language competence, and thus cannot be reliably used as representative measures of a person's bilingualism. He concludes that dominance can vary in the individual "by domain and across time, being a constantly changing personal characteristic" (Baker 2006: 35).

A final psycholinguistic categorization of bilingualism that merits mention is the compound-coordinate distinction (e.g. Lambert 1969 [1972c]: 301ff). It is to some degree related to patterns of acquisition, yet goes beyond the simultaneous-
consecutive taxonomy in that it makes explicit claims about the cognitive implementations of the two linguistic systems in the bilinguals' minds. It is most easily explained with reference to the mental lexicon of the bilingual, which is postulated to be based on a merged, or two distinct conceptual systems respectively. Later research has not always been able to corroborate the underlying distinction (Romaine 1995: 81), and to a certain extent the categorization seems to hearken back to restrictive conceptions about what a 'true bilingual' should look like, the coordinate bilingual usually being the bilingual of choice (cf. Fishman 1976, 1: 305). In any case, contemporary connectionist or distributed, as opposed to symbolic models of human cognition (Ahlsen 2006: 167-177) obliterate the need to fully commit to either a compound or a coordinate view of a person's bilingualism, because such models allow for the possibility that several, even disparate cognitive processes operate concurrently on any one linguistic task.

Summing up, several theories have been discussed which offer ways of describing bilingualism on the individual level. While patterns of acquisition and age of onset certainly do have a place in the description of a person's bilingualism, hard and fast categorization is generally difficult, because of the "multi-dimensional character of the phenomenon and the great degree of variability [within] each dimension" (Mackay 1967: 54). Because bilingualism is a variable and inherently social phenomenon, it is a sociolinguistic subject par excellence. Much of the rest of of my theoretical abstract will therefore deal with these sociolinguistic issues in bilingualism research, a reflection of the overall outlook of my study. This is not only true for the immediately following sections on social aspects of bilingualism and bilingualism in education, but also for later sections on linguistic variability in society, code selection, and identity.

### 2.1.2 SOCIAL ASPECTS OF BILINGUALISM

The central question in the study of bilingualism in its social context has been formulated by Fishman (1986: 437) as "who speaks what language to whom and when" [italics: original]. ${ }^{9}$ This question can be answered on a small scale, through the study of code switching and code choice in circumscribed communities, as will happen in the empirical part of my study. Because bilingualism is such a widespread social phenomenon, however, we might also wish to develop a terminology that allows us to compare and contrast various social groups as to the way they manage their linguistic codes. In other words, what kind of recurrent patterns can be observed in bilingual communities, and how can we best describe these patterns?

One of the concepts that have been offered in this regard is diglossia, a term popularized by Ferguson (1959 [1996]: 25) to describe a sociolinguistic configuration in which two linguistic codes (languages or dialects) fill complementary slots in the discourse of a society. A low variety, acquired in early childhood in the home, serves as a means of communication between family and friends, especially as far as everyday, informal conversations are concerned. A high variety, very often acquired as a result of institutionalized education, serves as the code in more formal domains, ${ }^{10}$ including official political discourse, academia, and - depending on the society - as the appropriate code for conversations between socially more distant acquaintances. What becomes apparent from this last point is that no two communities will be totally alike in the way they allocate their codes. If we want to gain a more detailed picture, we will, in turn, have to define which specific domains are associated with each code in a particular society. Detailed variationist studies thus serve as the underpinning of more general taxonomic terms such as diglossia.

[^7]Furthermore, an element of functional allocation between the codes will be present in many bilingual societies, without them necessarily meeting the strict definitional requirements of diglossia. Frequently quoted classic examples of diglossic societies (Fishman 1976, 1: 288f) include German-speaking Switzerland (high and low varieties are dialects of German) and Paraguay (H: Spanish, L: Guarani, two unrelated languages). In the English speaking world, uncontroversial examples are more difficult to come by. Jamaica and other English-speaking Caribbean nations are described by some as diglossic (Devonish 2006: 2087), while others argue they exhibit a creole continuum, which for them is qualitatively different from diglossia (Patrick 1996: 196). Relatively strong diglossic tendencies can be observed in some African countries, for instance South Africa, even though the law actually mandates otherwise in that nation (Phaswana 2003: 122). Related to this is Myers-Scotton's (2006: 87) distinction between classic diglossia and extended diglossia, the two being distinguished by the proportion of native speakers of the H variety in the respective population.

Regardless of whether they are native speakers of the H variety or not, it would seem that in a diglossic society almost everyone needs to have at least some command of both languages or dialects to function effectively in their community. Yet, Fishman (1976, 1: 286-299) suggests that this is not necessarily the case, and proposes an interesting model in which scales of diglossia (as a sociological concept) and bilingualism (as a psycholinguistic concept) intersect to produce a grid of four possible sociolinguistic configurations within a bilingual society. Communities which are diglossic, but where the population is not generally bilingual will be very stratified societies, with little interaction between higher and lower social strata. Early stages of colonialism could be quoted as an example of this type of community. In contrast to this, modern diglossic societies, in which free grade school education constitutes the norm, can be expected to have a population which is largely bilingual or bi-dialectal
(Fishman 1976, 1: 295). Further configurations in the taxonomy would be societies with neither bilingualism nor diglossia, and those without diglossia but with a population that is mostly bilingual. The last of these configurations Fishman (1976, 1: 298) sees as an inherently unstable matter of affairs, as in the absence of any functional connotations the maintenance of two distinct codes becomes superfluous.

Fishman's approach, while certainly appealingly parsimonious, in my view fails to provide a comprehensive taxonomy for bilingualism in society. Most importantly, it requires us to exclusively employ bilingualism as a psycholinguistic term, meaning a term only to be applied to individual people. This is revealed if we look at some of the most prominent examples of societies one would, in common speech, like to call bilingual. Canada, for instance, is constitutionally bilingual (Genesee 1996: 118), with the law requiring the consistent use of both national languages at the highest levels of government. As these laws are being meticulously enforced, one cannot characterize it as a diglossic society. At the same time, only a relatively small proportion of the population is functionally bilingual in the two national languages $(17.4 \%$ in 2006, cf. Corbeil \& Blaser 2007: 6), so that Canada would have to be classed as a society neither bilingual nor diglossic. ${ }^{11}$ Such societies are better accommodated in Hamers \& Blanc's (2000: 31) taxonomy, which is based on the relative proportion of bilingual speakers in the populace. At one end of their continuum they locate territorial bilingualism, such as in Canada, where relatively few people have to be truly proficient in both languages. Both codes reach over the whole functional spectrum, with a separation not by linguistic domain, but geographic locality. At the other end of the spectrum we can locate diglossic

[^8]societies, in which most speakers are functionally bilingual, and the codes do consequently not have strong geographic connotations. Various other types of communities, for instance societies with extended diglossia (Myers-Scotton 2006: 87), or societies with sizable immigrant populations we could place somewhere along this continuum. In these communities, there will often be a difference along ethnic, geographic, and social lines, but at the same time a clear functional allocation of the codes. Particularly in these latter cases, however, it will be interesting to know which part of the population is actually bilingual, meaning across such factors as social class, age, gender, or ethnic affiliation. This again underlines the notion that variationist studies of code choice are central to understanding bilingualism in its social context. Before I move on to these issues in sections 2.2.1 and 2.2.2, I would, however, like to focus on one further aspect of bilingualism, viz. bilingualism in education.

### 2.1.3 BILINGUALISM IN EDUCATION

In the discussion of bilingual language acquisition, a relative advantage of younger learners was noted. Education is thus a prime avenue to either further or retard bilingualism in society. Formal bilingual education can be traced at least as far back as ancient Rome, where the educated classes were "expected to be bilingual to a certain degree (utrisque linguae)" (Mackey 1967: 24). ${ }^{12}$ However, not all cultures and educational systems have held such favorable views towards bilingualism, something reflected in the many approaches towards bilingualism in education.

Forms of bilingual education can be classified by method or desired outcome. It is important to appreciate that the same method, applied within different social contexts, can produce divergent - even opposite - outcomes. This is because formal schooling is but one constituent element in the process of socialization,

[^9]and as such not deterministic independently of others factors. Considered from the point of view of desired outcomes, forms of bilingual education have been divided into the categories of subtractive and additive (Lambert 1980: 422). This distinction corresponds closely to the one between weak and strong forms identified by Baker (2006: 215-216) or the one between transitional programs and maintenance programs in Fishman's (1976, 2: 413-432) terminology. The first label in each pair would describe forms of bilingual education which do not aim at the development of bilingual competence. At their most extreme, such programs aim to restrict or punish the use of an already acquired home language. These extreme forms (for which the term subtractive is most appropriate) are generally associated with European colonialism and the forced marginalization of indigenous cultures. Such policies were pursued with regard to indigenous language communities in places such as Wales (Baker 1997: 128, Baker \& Jones 1998: 476), the Canadian residential school system (Heimbecker 1997: 57), Australia and Papa New Guinea (Romaine 95: 217, 218), or some private schools in Malta (Camilleri 1995: 79), to name but a few illustrative examples from the history of English colonialism. ${ }^{13}$ The severe psychological and emotional strain children suffer from such educational policies are easily apparent. Though the term itself has been criticized as a veiled pejorative for bilingualism itself, some (e.g. Baker \& Jones 1998: 477) have suggested that such forms of education tend to lead to semilingualism, i.e. limited proficiency of the bilingual child in all her languages. More commonly, though, weak forms of bilingual education simply place no emphasis on the development of bilingual skills, while they consider the development of monolingual-like proficiency in one language, usually the majority language, as a prime requisite of formal education. In many instances, educational systems will simply disregard the fact that part of the student population has a native language other than the medium of instruction. In cases where a substantial percentage of students share a home language which is not
the medium of instruction, however, it is common for authorities to introduce transitional programs (Grosjean 1982: 213, Baker 2006: 221). ${ }^{14}$ These programs do provide some instruction to minority students in their home language(s), yet this instruction is not aimed at the development of bilingual proficiency. Rather, the idea is to phase out instruction in the home language as soon as the students are proficient enough in the majority language to follow the mainstream monolingual curriculum. Transitional bilingual programs have a long tradition in the United States (Lyons 1996: 2ff), where they mostly cater to the (perceived) needs of students of Hispanic backgrounds. Proposals for stronger forms of Spanish-English bilingual education have frequently met with resistance and been denied public funding, so much so that sometimes even transitional programs are regarded too grave a threat to cultural cohesion (Grosjean 1982: 80). Proponents of this view have organized themselves into the English only movement, which is quite strong in some states and school districts in the western United States (Baker 2006: 394).

What all weak forms of bilingual education share is their disavowal of any responsibility in fostering bilingual competence in the child - either because bilingualism in itself is seen as undesirable for the individual and/or society at large, ${ }^{15}$ or else because the financial burden of stronger forms of bilingual education is considered to outweigh any positive effects that can be expected to result. Either way, it will depend largely on the social environment outside of school whether bilingual students develop their bilingual proficiency or strongly gravitate towards the majority language later in their lives.

Strong forms of bilingual education, in contrast, aim at the development of skills in more than one language. One possibility is that students have already acquired

[^10]proficiency in multiple languages. In these cases, strong forms of bilingual education would aim to maintain that proficiency, possibly with a focus on furthering competence in the language less well spoken. Alternatively, strong forms of bilingual education are sometimes designed to add one or several codes to the linguistic repertoire of students. Traditional foreign language teaching could be considered a form of bilingual education in this sense, though it is often discussed separately. Likewise, immersion programs (to be discussed shortly) constitute such additive exponents of bilingual education, albeit with a fundamentally different methodology from foreign language teaching. When discussing strong forms of bilingual education, it is always important to remember that language proficiency is a matter of degree. Thus, we could say that some bilingual programs are 'stronger' than others, i.e. that they aim at a deeper, or wider range of competences. The strongest forms of bilingual education would thus be those which aim at balanced competence in both languages. However, whether such an aim is realistic unless the student body consists of raised bilinguals is a matter of debate (cf. section 2.1.1).

If we now move on in our discussion from the desired outcomes of bilingual education to the methodologies employed to achieve these outcomes, then a main criterion will be the amount of time dedicated to instruction in each of the two languages. One extreme would be immersion or submersion education, in which there would in fact be only one language of instruction. Immersion would be the term applied to programs where majority language students are taught in a language other than their native language. These programs originated in Quebec in the 1960s, mostly to prepare English-speaking children for life in a community in which the French language was socially resurgent (Genesee 1996: 123). Initial fears that English-language competence of students would suffer as a result of this revolutionary approach proved to be largely unfounded. At the same time, the goal of truly balanced bilingualism was not always met, lending
support to the notion that family, peer group, and the wider community all exert an (often) underestimated influence on a child's linguistic formation (Genesee 1996: 128).

Submersion education would be the term used for the very same methodological approach (of only using a single language) when applied to minority students (Garcia \& Baker 1996: xvii). Here, the lack of input in their home language outside the family setting, plus negative attitudes towards the minority language in the wider community, often lead to attrition of competence in the first language. Alternatively, students might underachieve academically and drop out of school early (Baker 2006: 217). However, it must be noted that neither need result as a matter of fact. If the minority language has reasonable vitality in the community or the specific family, even submersion education can lead to relatively balanced bilingualism. Nevertheless, in the longer run it must be expected that at the very least, strong diglossia will result at the community level, since the minority language will be used only sparingly in higher functions. However, there is the problem that if strong diglossia already exists in the society, i.e. if the home language of some students lacks status and prestige in the wider community, teaching primarily in the home language might not be the most empowering option. As politically viable alternatives to submersion often contain a segregationist element, submersion (then often called mainstream education) is preferred by some minority educators. ${ }^{16}$

So far, I have covered educational approaches that in fact use a single language as medium of instruction, yet are relevant to our discussion because the student body in one way or another introduces an element of bilingualism. In cases where several languages of instruction are used, a whole host of new factors enter the equation. The ones I would like to focus on here are the proportion of

[^11]time allocated to each language on the one hand, and the question of who receives instruction in multiple languages on the other. ${ }^{17}$ Programs which allocate a roughly equal share of time to each of the languages are often referred to as dual language programs (Baker 2006: 228). One possibility here is that students from different linguistic backgrounds are educated together, drawing on their respective home languages. Alternatively, a linguistically relatively homogeneous group might be taught in a second language in addition to their home language. Such programs have been called partial immersion (Baker 2006: 205), and the rising popularity of content and language integrated learning (cf. Dalton-Puffer 2007: 1ff) could be seen as a move in a similar direction.

In other bilingual programs, the two languages are not used to the same extent in the classroom. We already saw an example of this in transitional bilingual education, and we can at this point add two further forms with a comparatively stronger aim, viz. foreign language teaching and the teaching of heritage languages. While both of these have in common that bilingualism is furthered mostly through designated language classes rather than through the use of two languages in content teaching, they differ in the types of students expected to attend these additional language classes. While foreign language teaching is designed for the student body at large, heritage language instruction is usually intended for students who have a different home language from the majority, or for whom there exists some pre-existing social bond to the language being taught.

As far as Vienna Bilingual Schooling is concerned, it could probably be described as either a dual language program or partial immersion. This is because part of the student population comes from an English home language background, but as previous studies have shown and my own confirmed, a majority still has

[^12]German as their native language. Of interest is the point made by Gräll (1999: 92, 119) that Vienna Bilingual Schooling could be characterized as (dual) submersion for a number of its students, namely those who have a home language background other than English or German. As for the desirability of this type of submersion, a balanced argument can be found in Hüttner (1997: 166), who amongst other things stresses the lack of viable alternatives for these students. In any case, this just goes to show that the issue of bilingualism in education is extremely complex from several perspectives: linguistic, politicalideological, and practical.

Summing up, we departed from the thought that to understand bilingualism in society, it is necessary to take into account the influence of the educational system. Conversely, however, one cannot appreciate the impact of particular forms of bilingual education without understanding the linguistic situation within the wider community. It is through this lens that I view much of the quantitative work of this study - it deals with an educational setting, and we cannot lose sight of the effects of this setting, but conversely I would like to discuss my findings of my study with reference to the wider social framework. Bilingualism in society and bilingualism in education are highly dependent. This goes to support the argument made in section 1.3, the rationale, that the following analysis - though limited and specific in scope - can and should be connected to a much wider and more general discourse in the sociolinguistics of English in expanding circle countries.

It was furthermore noted several times in the foregoing sections that bilingualism, whether viewed from a cognitive, social, or educational perspective, is a highly variable phenomenon. It therefore lends itself to a quantitative approach, as does much of sociolinguistics. In the following two sections, I would like to discuss the quantitative approach within sociolinguistics
more generally (section 2.2.1), then move on to scientific models that deal specifically with code choice (section 2.2.2).

### 2.2 Explaining code choices

As has been mentioned already, a model of code selection must be a central element in any sociolinguistic theory of bilingualism. Approached from the opposite angle, bilingualism and code selection are prime candidates for sociolinguistic analysis, as they are macro-level examples of variability in language, the very core of sociolinguistic research. Therefore, many of the discussions that concern linguistic variability more generally readily apply to the more specific issue of code choice. In consequence, section 2.2.1 gives an overview of the history of, and some of the more general theoretical issues within sociolinguistics, while section 2.2.2 will deal with the finer points of particular models of code selection.

### 2.2.1 LINGUISTIC VARIABILITY IN SOCIETY

In the study of bilingualism, variability in human language and its profound effects on both individual and society are easily apparent. Yet even in an environment where speakers ostensibly share a language, their codes often differ in ways readily observable to the average speaker. It is not surprising, therefore, that investigations into linguistic variability have a long tradition within the study of language. Thus, in nineteenth century Europe, there was much interest in the dialect topography of European languages, and painstaking efforts were made to chronicle localized forms which were considered to be endangered by advancing urbanization (LePage 1997: 17). Yet with the codification of linguistics into an accountable science in the early part of the twentieth century, concern with cultural and social aspects of speech, among them the social variability inherent in language, for a time receded into the background of the
agenda. Saussure (1916 [1959]: 13) established the dichotomy between langue and parole, and at least implicitly the practitioners of the nascent science of linguistics following in his tradition directed their attention towards the former as their prime object of study. That focus is made explicit by Chomsky when he writes that
[1]inguistic theory is concerned primarily with an ideal speakerlistener, in a completely homogeneous speech-community, who knows its language perfectly and is unaffected by [...] grammatically irrelevant conditions [such as non-linguistic cognitive or social conditions] in applying his knowledge of the language in actual performance. (Chomsky 1965: 3)

Variability is thus not denied, but relegated to the status of a marginal concern within 'linguistics proper'. Ironically, this restrictive view of what constitutes the core of linguistic study arguably contributed to the birth of sociolinguistics as a field in its own right, which was to adopt the task of describing and explaining all the aspects of parole which were disregarded by the generativists. Shedding the mostly antiquarian and folkloristic interests of traditional dialect topography, variationist studies within the new paradigm took inspiration from the emergent social sciences. Whereas heretofore social factors had received little attention, or else were regarded as an undesirable adulteration in the measurement of regional linguistic variability, ${ }^{18}$ now the social dimension rose to new prominence. In addition, variation came to be studied by recourse to more elaborate statistical models, adding a new level of academic rigor to the discipline.

The birth of this new, quantitative sociolinguistics is often associated with William Labov's work, for instance his analysis of the "social stratification of English in New York City" (Labov 1966 [2006]: title). In his study, Labov conducts a statistical analysis of the realization of several linguistic variables in the speech of New Yorkers in relation to the independent variables of social class
and speech style. The most-often cited of these variables is $(r)$, the frequency of overt realization of non-prevocalic $/ \mathrm{r} /$ in the speech of his respondents. Labov (2006: 152) establishes that the frequency of zero-realization of the variable ( r ) is inversely proportional to a rise in the social status of the speaker, as well as inversely proportional to a rise in the formality of the speech style. This pattern is only violated by the second-highest social class in Labov's analysis, who hypercorrect in the most formal of speech styles, meaning that they have a higher frequency of ( $r$ ) than would be predicted for by the underlying model. These findings are ultimately explained with reference to shared social norms in the overarching speech community of New York City, which ascribes high prestige to overt (r). Labov's research provided a template for much subsequent work in sociolinguistics: variation in a linguistic feature is explained by recourse to social variables. At the most basic level, this is indeed the structure of my own project, in the sense that variability observed in code choices is to be correlated with various social and sociolinguistic factors.

Despite the seminal status of Labov's work, later research pointed out some of the limitations of his survey methodology and the concept of the speech community. One charge is that the methodology relies too heavily on preestablished social categories, thereby prejudicing the results of research in ways dictated by the assumptions of those conducting it (Patrick 2002: 585-588). In other words, one needs to have a relatively good idea of the structure of a given community to be able to draw up a list of relevant social factors along which the linguistic phenomenon one observes might vary. Certainly, there are some factors, such as gender or age, which will be good candidates in most settings. Other factors, however, such as social class, are sometimes considered to be concepts too vague or compound to be admissible as a means of prima-facie categorization. Even if we accept that statistical significance should be the criterion upon which to judge whether a chosen factor merits inclusion in our
description, a model based on the survey methodology can disguise the fact that there are speakers whose behavior does not follow the overall pattern. These doubts about the usefulness of rigid and predetermined conceptualizations of social reality was what encouraged the development of alternative methodological frameworks, such as network analysis or communities of practice, within sociolinguistic research.

Social network theory is an approach which draws on the actual social relationships people contract rather than on the pre-established social categories, and can complement the survey methodology in this regard. Already introduced into the linguistic literature by Blom \& Gumperz (1972 [1986]: 433), the analysis of social network structure is central to Milroy's (1987a) study of ethnic varieties in Belfast, as well as Milroy \& Wei's (1995) research into the Tynside Chinese community. Unlike the traditional paradigm of the survey methodology, network theory enables the researcher to account for differences in linguistic behavior between people who ostensibly fall into the same social categories if one resorted to more abstract ways of analyzing their social position. To provide an illustration of this idea, Milroy and Wei (1995: 146) argue that, generally speaking, older speakers in the Tyneside Chinese community use a greater degree of Chinese (as opposed to English) in their daily lives. However, through social network theory, they are able to account for the fact that some older speakers do not conform to this general pattern, viz. precisely those whose network ties more closely resemble the ones usually contracted by the younger generation. ${ }^{19}$ Thus,
the network concept was developed [...] to explain individual behaviour of various kinds which cannot be accounted for in terms of corporate group membership. (Milroy 1987a: 135)

[^13]While network theory excels at highlighting and explaining individual differences by detailing the social universe of a specific speaker, overall patterns in the network can also be correlated with broader sociolinguistic developments. Two central concepts in this regard are density and multiplexity:
[M]ultiplexity and density are conditions which often co-occur, and both increase the effectiveness of the network as a normenforcement mechanism. (Milroy 1987a: 52)

Thus, dense and multiplex networks support the maintenance of minority languages and dialects (Milroy \& Gordon 2003: 118). A network is described as dense if the people in the network are tied by a high number of reciprocal links. The densest possible network would be one in which everybody interacts and communicates with everybody else on a regular basis. In looser networks, many links are of an indirect nature, meaning many members of the network are only connected through third parties. If we describe such a network from the position of a focal point (i.e. a particular person in the network) we could say that few of his or her contacts will know each other. Of course, except in the case of very isolated communities, networks are open ended in nature, so that we can realistically only speak of sections in a network as being dense. Such a section of a network characterized by "relatively high density" (Milroy 1987a: 50) would be referred to as a cluster. Multiplexity, the second factor mentioned as conducive to language maintenance, describes the nature of specific networks ties, or by extension the average or general nature of all the ties in a network. A multiplex tie would be one in which the two people are connected in a variety of different social relationships, meaning they interact in a variety of different domains. For instance, people might know each other both as colleagues in the workplace and as neighbors in the community. If a whole network is described as multiplex, this means that most ties in the network are of a multiplex nature (i.e most people interact with each other in several different social contexts). To recap, the central idea of density and multiplexity is that they are qualities that
allow us to identify relatively well-defined and partly insulated sub-sections in the network, i.e. clusters. These sub-groups should be able to sustain certain idiosyncratic forms of behavior even in the face of differing norms in the wider community. This idea of communities with shared values and patterns of behavior carries over to the research of Eckert (2000), who augmented network theory by introducing into the sociolinguistic literature the concept of the community of practice.

Communities of practice are sections of a network that are defined by relative density and multiplexity (Milroy \& Gordon 2003: 119), though the exact definition goes further than these two characteristics. Eckert (2000: 46) conceives of communities of practice as groups of people who "come together around common endeavors," and who engage in shared social practices. Unlike social classes in the survey methodology, communities of practice are not postulated to exist by the researcher, but are discovered through intense and prolonged ethnographic fieldwork (Eckert 2000: 69). At Belten High, a secondary school in Michigan, Eckert (2000: 47, 112) detected two primary communities of practice, jocks and burnouts, memberships in which - in conjunction with gender, but superior to social class - provided the best correlational effects with several phonetic variables. In other words, membership in a specific community of practice is, in this specific context, one of the best independent predictors of linguistic behavior. The relevance of that finding lies, first, in the necessary recognition that forms of social categorization might exist in a given community which the researcher is not aware of beforehand, but which might be the most revealing if charted against the dependent variable(s). Second, based on her experience at Belten High, Eckert (2000: 111) stresses the importance of peer-group ties as opposed to other social relationships in shaping linguistic norms, especially among adolescents.

Their perspicuous benefits notwithstanding, network studies should be seen as a complement to, not a replacement of surveys relying on pre-existing social categories. Milroy (1987a: 37f) points out that the survey methodology allows us to collect the large amounts of data which are necessary for establishing representativeness, with statistical significance as the necessary yardstick against which the actual effects of hypothesized independent variables can be measured. Second, there are some social categories, to mind comes gender, that are so fundamental to social structure that they are good candidates to test as factors in almost any type of setting. Network analysis and survey methodology can thus be viewed as complementary procedures on a cline from more ethnographicallyinspired work to quantitative social analysis, procedures each of which have their own advantages and drawbacks (cf. Hammersley 1992: 162). Most importantly, they work on different scales, and therefore involve trade-offs between the level of detail in the description on the one hand, and the ability to generalize and extrapolate from the findings on the other. Ultimately,
[no] method of analysis is likely to capture completely the complexity of the way speakers use variability (Milroy 1987a: 115) [and a] coherent theory of language choice and code-switching needs to make explicit the relationship between community networks [...] and large-scale social and economic structure. (Milroy \& Wei 1995: 153)

The whole foregoing argument can also be framed as a discussion of the exact nature (or even usefulness) of the concept of the speech community. While the original concept presupposed uniformity of linguistic norms across a relatively well-defined set of people, subsequent modifications of the definition could seldom agree on either the exact nature or proper size of a speech community (Patrick 2002: 574). Rather, the eagerness of academia to view social structure as complex, multi-layered, and ever-changing means that speech communities need to be constantly "constituted anew by the researcher's gaze and the questions we ask" (Patrick 2002: 593). This is, however, a serious departure from earlier, much
more rigid definitions of the concept. The whole argument is easily illustrated within the context of bilingualism. Here, we would have to decide whether we should speak of two speech communities in contact or one bilingual speech community. Originally, the speech community was often equated with the sum of all speakers of a certain language or variety (e.g. Hockett 1958: 58), in which case it would have little value in the analysis of bilingual speech. By this token, for LePage \& Tabouret-Keller (1985: 243),
[ t ]he mere fact that linguists want to talk about 'speech communities' betrays a bias [towards] monolingual language use and univocal identity.

Gumperz (1972: 463), on the other hand, believes that a speech community need not be "coterminous with a single language," and can indeed be bilingual diglossic societies would be a case in point. Lüdi (1987; translated in Milroy \& Muysken 1995: 10) argues that bilingual conversations can occur both within and between speech communities, and introduces the terms endolingual and exolingual to distinguish these two scenarios. The problem remains, of course, that participants in an interaction will often share some, but not all of their linguistic norms, with the normative system evolving over time as new communities or social relationships become established. The rather rigid concept of the speech community thus ignores the more fluid, dynamic, and performative elements of social reality (an issue picked up in section 2.3 on sociolinguistic identity). However, the discussion of models of code choice in the following section will reveal that questions about the existence and exact locus of well-defined linguistic norms in society cannot wholly be escaped.

### 2.2.2 MODELS OF CODE SELECTION

Code choice and code switching ${ }^{20}$ as an object of study has undergone a similar transformation as the study of bilingualism itself. Originally, code switching was widely regarded a sign of imperfect language development in the bilingual, so that even those linguists who held positive views towards bilingualism often disapproved of the practice. Code choices were to be determined by 'objective' factors such as interlocutor and topic, while recurrent or intrasentential code switching were considered a sign of deficient bilingual development (e.g. Weinreich 1953 [1970]: 74). Only with renewed and detailed study of the phenomenon within a sociolinguistic framework came the realization that code switching is governed by precise linguistic constraints and nuanced social rules. Rather than a haphazard back-and-forth rooted in a lack of linguistic competence, it is a tool in the repertoire of a bilingual or bidialectal speaker. Blom \& Gumperz (1972 [1986]: 424) were among the first to view code selection in this manner, and based on their field work in Norway they identified two basic categories of code switching, situational and metaphorical. Situational code switching is defined as a switch in which the social environment changes in a way which makes a different code more appropriate. ${ }^{21}$ An example would be a new speaker joining a conversation, or a change to a different domain of social life. Metaphorical code switching, on the other hand, would be the name given to a switch occurring in the absence of any external impetus. Rather, the switch is a device to add a further layer of meaning to a given message, for instance to establish rapport, or to indicate stress or irony. These two, broad categories are a

[^14]very helpful first step in the analysis of code choice and code switching. However, situational switching can have many different causes, while metaphorical switching can be exploited in a variety of different ways. In the following, I would like to introduce three more elaborate models of code selection, which each in their own way build on the two basic categories of situational and metaphorical switching. These are the markedness model and communication accommodation theory, both of which explore further mostly the situational side of code selection. ${ }^{22}$ After that, I would like to shortly review conversation analysis, which puts more emphasis on the dynamics of the bilingual interaction, in other words the metaphorical aspect. As in the preceding sections, I will conclude with some words on which theoretical approaches can be expected to be the most yielding within the context of my particular project.

An influential social-psychological model of code switching was developed by Myers-Scotton (1993: 113ff; 1998: 18ff, 2006: 158ff) based on her studies of the phenomenon in the African context. Ultimately rooted in the ideas of pragmatics, most fundamentally Grice's (1989: 28) maxims of conversation, her markedness model tries to strike a balance between the determinism of socially encoded norms on the one hand, and individual agency and creativity on the other. Norms would be represented in her model through $R O$ sets - sets of social rights and obligations - and their associated unmarked codes. Room for creativity in her model stems from the possibility of intentionally marked code choices. The default option in the markedness model would be that participants in an interaction choose a certain code based on the rights and obligations of the participants within the current social and conversational setting. This unmarked code, it is assumed, is known to the participants because it is part of our knowledge of the social world, part of our communicative competence, to use

[^15]Hymes's (1977: 75) terminology. However, speakers do have the option to use a code other than the expected one, but such a choice would be marked - and thus carry additional communicative value compared to the unmarked choice. A marked choice could be motivated either by a desire to redefine or negate the RO set of the current interaction, or it could be intended to achieve a special rhetorical effect (Myers-Scotton 1993: 139). The latter scenario would be similar to the notion of metaphorical switching encountered earlier. One important novelty in the markedness model is the concept of sequential unmarked code switching (Myers-Scotton 1993: 117). The idea here is that in some communities or relationships, the unmarked code itself might be recurrent code switching. In these cases, we need not assign a specific meaning to each switch, but can see the overall pattern as significant.

The major strength of the markedness model is undoubtedly its ability to reconcile individual psychological agency with shared linguistic norms. On the flipside, the model relies on language attitudes as being relatively homogeneous across the community. In actuality, group membership and shared norms will often be a matter of degree. ${ }^{23}$ Myers-Scotton (1993: 91, 109) draws attention to this problem herself, but argues that empirical data generally support the assumption of shared norms in the wider community. For those instances where this is not the case, Myers-Scotton (1993: 142) introduces the concept of exploratory code switching, which if applicable overrides the other principles in the model. That is to say, if an underlying social consensus as to the unmarked code is missing, speakers must first, through a series of switches, establish an unmarked code for the new communicative setting. Still, it could be surmised that the model, through its reliance on socially encoded norms, has most explanatory power in the study of established bilingual communities with stable

[^16]sociolinguistic norms. In more novel or impromptu cross-cultural settings, or whenever speakers yet have to negotiate their relative social positions, it might be necessary to supplement the model with other theoretical approaches. One such approach is communication accommodation theory.

Communication accommodation theory (abbr: CAT; Giles, Taylor \& Bourhis 1973: 177ff; Giles \& Coupland 1991: 60ff; Coupland, Coupland \& Giles 1991: 25 ff ) is an addressee-centered model of code selection which views code choice as a process of negotiation between the participants in an interaction. It was formulated in reaction to models of code choice which viewed context as central in the selection of an appropriate code (Giles \& Coupland 1991: 62). Discussed in relation to the markedness model, CAT is helpful in that it explores how unmarked code choices come to be established between speakers. Convergence is the most basic concept and default option in CAT, meaning that there is a general tendency in verbal interactions to arrive at a relatively uniform code, even if both speakers are able to comprehend the code their conversational partner is most fluent in (overt accommodation). While a bidialectal set-up certainly allows for greater nuance in the choice itself, a bilingual setting, too, offers an array of possible options, from exclusively using one of the languages involved, to employing both to an almost equal degree (cf. sequential unmarked code switching above). In addition, CAT can also be used to explain (covert) accommodation in terms of the speech rate or vocabulary in instances where not all the speakers are equally proficient in the languages involved (Coupland, Coupland \& Giles 1991: 26, 29). Divergence, the opposite of convergence, happens if speakers want to underline their mutual differences, i.e. if they have little to gain from establishing a shared identity with their respective interlocutors. While certainly not the default scenario because of the goaloriented nature of social interaction, it is an option that needs to be borne in mind. While clear divergence will be seen as uncooperative most of the time,
full convergence is not always desired by the conversational partners either. Thus, over-accommodation, i.e. an amount of convergence which is not warranted by the social situation or the social relationship, might be perceived as a form of mockery rather than motivated by a genuine desire to bridge the social gap (Coupland, Coupland \& Giles 1991: 30).

Communication accommodation theory can be applied in a wide variety of contexts, meaning that the term code selection is understood in the widest possible sense here. Coupland, Coupland \& Giles (1991: 30ff), for instance, researched speech patterns found in communication with the elderly. ${ }^{24}$ The focus of the theory lies on the fundamental social-psychological processes which operate in any verbal interaction, irrespective of the particulars of the situation. At a very basic level, CAT is grounded in the analysis of linguistic politeness strategies, so that code choices can be explained by reference to fundamental sociological concepts. Scollon \& Wong Scollon (1995: 41-47) develop such a system in which codes are negotiated on the basis of face, power, and social distance. While power and social distance are the independent variables, so to speak, face is the underlying cognitive concept that drives the dynamics of the negotiation. Different face systems, i.e. different assumptions about face, introduce a conventionalized cultural element into the equation, somewhat akin to different RO sets in the markedness model. ${ }^{25}$ As Coupland, Coupland \& Giles (1991: 109) point out, the concept of face and its centrality in CAT also point towards issues of identity, a topic which will be discussed in greater depth in section 2.3. Contrasting CAT with the markedness model, one can say that, without a doubt, code choices have a conventionalized nature in long established social relationships. However, CAT allows for a deeper investigation into the

[^17]social and psychological significance of these conventionalized choices, and how they come to be established.

There is one more aspect of code choice which some have contended is neglected in both the markedness model and CAT, which would be the immediate linguistic context (or co-text) of each choice or switch. I will therefore conclude with a short discussion of conversation analysis, an approach which addresses precisely this element. The underlying idea of conversation analysis (Auer 1984, Auer 1992) is that code selection cannot be meaningfully discussed without reference to the immediate linguistic context in which each choice occurs (Auer 1992: 21). At a very basic level, this would be the case whenever speakers continue to use the code which has been used previously in the conversation, something which Grosjean (1982: 152) refers to as triggering. Whenever this pattern is violated, the switch has to be discussed, in part, with reference to what has gone before. Thus we cannot simply look at the language chosen, and attribute meaning to the choice with reference to social norms and the speakers only, because often, in the assumption of conversation analysis, the switch itself is the meaningful event, not necessarily the new code selected. In support of this argument, Milroy \& Wei (1995: 148f) quote data from the context of an English-Cantonese bilingual family. In order to mark a dispreferred response (e.g. the rejection of an offer), the children switch both from the home language to the community language and vice versa. It is thus impossible to attribute certain psychological or emotive qualities to either code as such. Instead, "the contrast is more socially meaningful than the actual choice of language" (Milroy \& Wei 1995: 149). In this fashion, conversation analysis can help elucidate some choices which other approaches do not explain exhaustively. Ultimately, the approach is probably most applicable in very dynamic bilingual settings, where switches occur frequently and where there is little social distance between the participants (thus allowing for relatively free code choice). In these
instances, conversation analysis might reveal that rather than a sequence of unmarked code switches, a departure from the previously spoken language might, in fact, have its specific local meaning. However, as Milroy \& Wei (1995: 147, 153; cf. also Auer 1995: 116) stress in their article, conversation analysis cannot altogether replace more abstract social models of code selection, and the larger social context in which certain interactional episodes take place should not be lost sight of. Especially if there is a desire to work within a quantitative paradigm, conversation analysis is more difficult to apply. This is confirmed by Auer (1984: 3), who writes that
an indeterminate number of interpretations [for each code switch] can be arrived at, [and that conversation analysis has a] procedural instead of a classificational interest, [with no desire to develop] a scientific construct designed to 'fit the data'. [quotation marks and italics: original]

Thus, depending on the type of community researched, as well as the scale of the description desired, one can either focus on the conversational, or the macrolevel of code choice. Within the context of Vienna Bilingual Schooling, the macro-level (focusing on the relationship between speaker and interlocutor, as well as large-scale social norms) was judged to be the more rewarding approach. This outlook is reflected in my methodology (section 3.2), which draws mostly on the markedness model, supported by certain aspects of CAT. Before I move on to my empirical project, however, I would like to briefly explore the concept of identity, both because of its frequent use in the literature, and because it naturally follows from the discussions on linguistic variability, the nature of linguistic communities, and models of code selection covered in this and previous sections.

### 2.3 The sociolinguistics of identity

Identity as a concept, be it as an explanatory construct or as an object of study in its own right, has in recent years gained currency in a variety of academic disciplines. In two different guises, the concept already surfaced in the previous section. First, Scollon \& Wong Scollon (1995: 34) equate their notion of face, briefly introduced as an element within accommodation theory, with the concept of identity. Second, Meyerhoff (2000: 523) argues that identity could be seen as constituted by the various memberships in communities of practice which an individual contracts. Both of these assertions are attempts to integrate the concept of identity into other explanatory frameworks within sociolinguistics, speaking to the prominence the term has acquired within the literature. More often, though, identity is defined independently, as a socialpsychological or sociolinguistic concept in its own right. In the following, I would like to quote three slightly different definitions, which shall serve as a starting point for discussion:

Identity is...
(a) [the sum of] psychological processes involved in the construction of the self with regard to group membership (Hamers \& Blanc 2000: 200).
(b) the active negotiation of an individual's relationship with larger social constructs, in so far as this negotiation is signaled through language and other semiotic means (MendozaDenton 2002: 475).
(c) [the] knowledge of our membership in certain social categories [...], together with the values (positive or negative) attached to them (Giles \& Coupland 1991: 105).

All three definitions, in one form or another, mention group membership as a defining aspect of identity, though (b) and (c) are slightly more cautious than (a) in this regard, preferring to speak of social constructs and social categories instead. We shall turn to this issue of social group membership a bit later in the
discussion. Before that, I would like to focus the remaining elements of the three definitions, because it is in these that one can detect pronounced differences. First, I would like to elaborate on the contrast between definitions (a) and (b), which reflects two possible methodological approaches in researching issues of identity. Second, I would like to briefly contrast (a) and (b) on the one hand, with definition (c) on the other. This second contrast arguably arises out of slight cultural differences in the understanding of the term identity.

The different approaches taken in definitions (a) and (b) demonstrate the dichotomous nature of the concept of identity, which could be said to mirror the relationship between competence and performance that we find in structural linguistics: definition (a) conceives of identity as a set of cognitive states and processes, placing it within the realm of social psychology. Definition (b), on the other hand, emphasizes that we must observe the actual manifestations of these psychological processes in social interaction, be it on a linguistic level, or within alternative semiotic systems. Identity here is a process of negotiation, a constituent element of social interaction, and invariably tied to communicative events within a meaningful semiotic framework. Definition (b) thus has the advantage that it allows us to neatly isolate linguistic identity, the part that is "signaled through language," from other manifestations of a person's identity. More importantly, however, the two definitions reflect two complimentary approaches to investigating issues of identity:
(i) by eliciting introspective psychological data; ${ }^{26}$
(ii) through its surface representations, i.e. social interaction, in our case in the form of linguistic choices.

[^18]The relative advantage of the latter approach lies in the fact that we will usually have direct access to the representational face of identity, which in our case is simply the linguistic data before us. Gaining access to the underlying cognitive dimension, on the other hand, might be more problematic an idea, because cognitive processes do not always operate above the level of consciousness. Even to the extent that they do, they are directly accessible only to the individual, not the researcher, and willingness to disclose sensitive personal information might on occasion be limited. ${ }^{27}$ Still, interest in the concept of identity arose precisely because scholars desired to "rise beyond just describing [...] social phenomena" (Omoniyi \& White 2006: 1), meaning that to apply the concept of identity fruitfully we must move beyond the strictly observational. To do so, it is not always necessary to collect introspective data, because the researcher can rely on her or his general knowledge of the cultural milieu and psychological processes in order to arrive at a conjectural model of the social-psychological underpinnings of the patterns found in the surface data. If such a model can fulfill basic requirements such as internal coherence and consistency, as well as applicability to different sets of data, it can be a valid social-psychological description of linguistic identity. It goes without saying, however, that a more comprehensive approach, which tries to amalgamate and associate the patterns found in the linguistic data with introspective social-psychological data, will usually allow us to make more substantiated claims about the influence of identity-related processes on linguistic behavior. Therefore, this is the approach taken in my study of code choice at Vienna Bilingual Schooling, and the various quantitative and qualitative measurements that are designed to supplement the strictly linguistic data will be laid out in section 3.2.3.

[^19]So far, I have discussed differences that arise out of competing methodological approaches to the concept of identity, and demonstrated that it has both underlying psychological, as well as overt social representations. Definitions (a) and (b) are indicative of this contrast. Their differences notwithstanding, both (a) and (b) define identity as a process rather than a static entity, quite unlike definition (c). It must be stressed that definition (c) by no means excludes the possibility of change, yet the lack of emphasis placed on this compared to the other two definitions is significant. To what extent an individual's identity is malleable and subject to constant (re-) negotiation is an important cultural question. Scollon \& Wong Scollon (1995: 36) assert that there are
significant cultural differences in the assumptions made about the 'self' that is involved in communication. The idea of 'self' which underlies western studies of communication is highly individualistic, self-motivated, and open to ongoing negotiation. We believe that this concept of the 'self' is not entirely appropriate [in all cultural contexts]. ${ }^{28}$

While cultural differences in this regard will certainly exist, the more important observation from my point of view seems to be that an individual's identity will rarely, in any culture, be entirely static or determined by outside forces on the one hand, nor entirely under the control of the individual on the other. This is because "identity [is] both discursively constituted and constructed in interactions with others" (Preece 2006: 177). As he goes on to argue, the discursive subject occupies both passive and actives positions within the social framework. Along very similar lines, LePage \& Tabouret-Keller (1985: 2) observe that "the individual's idiosyncratic behaviour reflects attitudes towards groups, causes, traditions," yet "is constrained by certain identifiable factors". This means that as participants in social interaction, we are able to follow our own predilections, but are at the same time constrained by the evaluations of others

28 As has already been pointed out, Scollon \& Wong Scollon (1995: 35) start out from the concept of face, but readily equate this with identity. The 'self' in this paragraph must therefore be assumed to be conceptually equivalent.
and their willingness to accept the identity we wish to fashion for ourselves. In the context of sociolinguistic identity, this leads to the following question:

To what extent is group identity a matter of choice, and what are the conditions for admission to a linguistically defined group? (TabouretKeller 1997: 322)

The answer she gives has four items:
(a) one can identify the groups;
(b) one has both adequate access to the groups and ability to analyze their behavioral patterns;
(c) the motivation for joining the group is sufficiently powerful, and is either reinforced or lessened by feedback from the group;
(d) we have the ability to modify our behavior.
(Tabouret-Keller 1997: 323)

Thus, any essentialist equation of certain codes or linguistic features with a particular community is not possible. At the same time, while the individual does have an active role in the formation of their linguistic identity, they are constrained, first, by their ability to modify or expand their linguistic repertoire, and second, by the willingness of an established group to accept that person into the group - the latter a decision not always based on linguistic factors alone. Applied to the setting of Vienna Bilingual Schooling, this means that we are likely to find that most students are involuntarily constrained as to which identities they can project by such factors as their linguistic abilities or their accents. ${ }^{29}$ They will thus be identified by their classmates as belonging to certain socially pre-established categories. At the same time, students can be expected to use features of language, for instance language choice, in ways that help to create new social categories and group relationships within their specific bilingual community.

[^20]One final issue that has only been alluded to so far merits additional discussion: the previous paragraph dealt with social groups and group membership; it would probably be mistaken to believe that these groups are always transparent to the members of society, or easily discovered by the researcher. Much of our social competence, including our recognition of social groups, will be implicit rather than explicit knowledge. Similarly, it would probably be difficult to describe social relationships in strictly symbolic terms, because they will often be distributed in nature, meaning that groups tend to overlap and do rarely posses fixed boundaries. Because of this, Agha (2007: 268) argues that any "static ontology of 'social groups', [together with] the repertoire of group names from which the static ontology is derived," is too simplistic a model of social relationships. This means that in social interaction, the individual can establish relationships of solidarity which might not be easily encapsulated by a readily available designation. At the same time, some categorizations
are widely known and highly transparent to members of society. The ability to invoke such classifications in mutually intelligible ways itself mediates, even maintains, a sense of group unity and cohesion. (Agha 2007: 269)

The latter can easily be demonstrated in the linguistic context, where linguistic communities, i.e. speakers who share a native language, nearly always have a common label by which they can be identified. What the foregoing paragraph wanted to express is that while such transparent categorizations certainly exist, and while their importance should not be underestimated, linguistic resources can nevertheless be used by the individual in ways much more subtle than this.

Summing up, this section discussed three major issues concerning the concept of identity in sociolinguistics. First, two methodological approaches were discussed that are representative of the interdisciplinary nature of the concept, in that it spans sociology (or in my particular case sociolinguistics) and social psychology. Thus, it can be studied through its overt manifestation in social interaction (for
instance language) as well as via introspective psychological data. Second, it was mentioned that social relationships are dynamic in nature, giving the individual an element of agency in constructing their identity. At the same time, people are constrained by the external evaluations of others. Third, and this relates back to our discussion in section 2.2.1, ${ }^{30}$ it was mentioned that some social relationships can easily be encapsulated by transparent and obvious categorizations, but that this limited taxonomy of group names cannot be expected to provide an exhaustive description of social reality. Having come full circle in this way several times, each piece of theory leading on to the next, or referring back to an earlier discussion, I believe it is now time to move on to the empirical part of this study. I would like to start this new section with a more detailed outline of the specific context in which I conducted my research.

[^21]
# 3 THE EMPIRICAL PROJECT 

methodology, results, \& discussion

### 3.1 The context

The empirical research was carried out with students (upper secondary level) at two high schools affiliated with the project Vienna Bilingual Schooling: IBC Hetzendorf ${ }^{31}$ and Grg23/VBS Draschestraße. The pedagogical and organizational precepts of Vienna Bilingual Schooling are discussed in more detail in Hüttner (1997: 88ff) and Gräll (1999: 54ff), while my understanding of the day-to-day operations stems from having spent time at the schools during the period of my research. On a formal level, Vienna Bilingual Schooling could be described as a dual language program, with teaching time being allocated about evenly between the two languages, and neither language being phased in or out over time. ${ }^{32}$ A number of teachers in each school have English as their native language and/or received their education and training in an Englishspeaking country. Essentially, teachers mostly teach in their respective native languages, though this separation is not overly strict. A description of the formal framework of Vienna Bilingual Schooling is thus relatively straightforward. Much more difficult to circumscribe, however, is the second important aspect of this program of bilingual education: the kind of student population that it is designed for. In its original conception, the program envisaged that students from both German and English language backgrounds would be taught together with English and German as the languages of instruction. The language

[^22]backgrounds were to be about evenly distributed, so as to facilitate peer learning in terms of language competence. Given the overall demographics of Vienna, Hüttner (1997: 94f) demonstrates that it is unreasonable to expect such a quota to be met. Not surprisingly, therefore, previous studies found that the linguistic situation at schools in the program was much more diverse, contradicting notions of neatly defined German and English-speaking groups. ${ }^{33}$ In practice, the students' linguistic biographies are extremely varied, and often include a combination of German, English, and various other languages. To neatly describe the population in conventional terms is thus difficult, but I would argue that this is characteristic of many contemporary manifestations of bilingualism. From a methodological point of view, this entails that it will be necessary to collect detailed linguistic and educational biographies from each and every respondent, rather than relying on overly broad or simplified categories. In this way, certain assumptions about the population were guiding elements in the research design outlined in the following pages.

### 3.2 Outline of the methodology

Apart from rough preconceptions about the setting and the target population, the theoretical framework laid out in section 2 was the guiding reference in my research design. In this previous section, it was discussed how both quantitative and qualitative approaches involve certain trade-offs (with regard to the detail of the description, on the one hand, and issues of generalizability on the other, cf. Hammersley 1992: 162). Therefore, my own methodology, though essentially quantitative in nature, nevertheless contains elements of both approaches. Data for the central quantitative analysis were collected by means of a questionnaire,

[^23]the design of which is covered in section 3.2.1. Multivariate analysis was used to build a model of these data, a statistical tool which is discussed in section 3.2.2. Supporting ethnographic data comes from some open questions in the questionnaire, as well as from interviews and stints of observation, as laid out in section 3.2.3.

### 3.2.1 QUANTITATIVE DATA: THE QUESTIONNAIRE

Before getting into more practical issues of questionnaire design, it might be necessary to mention that questionnaire surveys are not the only basis from which quantitative data for a study of code choice could be extracted. Natural data, in the form of ready-made or self-compiled corpora similarly allow for a quantitative approach, and are considered by some to be superior in felicity and accuracy to self-reported data (Wray, Trott \& Bloomer 1998: 187). In the sociolinguistic analysis of face-to-face interaction, however, especially if we want to maximize the number of respondents in our research, the extent to which we can rely on natural data is limited by several practical and theoretical concerns. While the transcription of linguistic data from audio recordings is time-consuming but possible, in any but the smallest of groups it will often prove difficult to ascertain who the speaker was at any given moment. Therefore, the main goal of sociolinguistic analysis, viz. to tie linguistic features to social attributes, will often be defeated. Video recordings are a possible solution to this conundrum - however, being videotaped is even more intrusive than being voice-recorded, heightening problems associated with the observer's paradox. ${ }^{34}$ This means that data collected in such a fashion might actually prove less natural than desired. What is more, the researcher would have to be fairly familiar with the group if he or she wanted to transcribe data from a recording, a requirement generally difficult to reconcile with any aspirations to maximize the

34 A term coined by Labov ([1966] 2006: 86) to describe the paradox that, in sociolinguistics, we strive to "observe how people speak when they are not being observed".
size of the sample. Participant observation is another possible method of collecting data on language choice in a community. However, either the data is again audio-recorded by the researcher, leading to the problems already discussed, or else the researcher makes exact notes after each conversation something which even with a good memory can be a challenging task. More importantly however, we must recognize that
[p]roblems associated with the observer's paradox seem to be greatly increased in bilingual communities [compared to other settings of variationist research]. (Milroy 1987b: 184)

Unless the researcher has been an integral part of the community for some time, it must be expected that linguistic accommodation will at times gravely distort linguistic choices if they are recorded through participant observation. On the other hand, there are several reasons to suggest the questionnaire survey might well be a viable approach in bilingualism research more generally, and within the setting of Vienna Bilingual Schooling more particularly. First of all,
[ $t$ ]he enhanced consciousness which bilinguals have of competence in two separate codes makes it feasible for researchers to ask speakers to report actual behaviour. [italics: original] (Milroy 1987b: 185)

I believe this is especially true if most of the respondents are not raised bilinguals, and there is only a moderate amount of code mixing in the community, both permissible assumptions in the case of Vienna Bilingual Schooling. Two important provisos that Milroy (1987b: 186) adds to her assertion are, first, that one language might be heavily stigmatized and therefore underreported, and second, that mixed codes are often viewed negatively, again leading to a reluctance to report them. As for the first concern, the stigmatization of one language over the other, it can be assumed that in a contact situation involving English and German any such effect should be fairly muted. Both languages can be characterized as strong and vigorous European languages, and while attitudes in a bilingual community towards the two codes will never be wholly identical, neither English nor German can be regarded as a
stigmatized variety in the sense that this term is generally understood. The institutional framework of Vienna Bilingual Schooling, as briefly outlined earlier, can only be expected to strengthen the parity in status between the two languages. As far as concerns about possible underreporting of mixed codes go, open questions were introduced into the questionnaire to elicit language attitudes towards code switching and code mixing, providing a rough gauge of perceptions that exist in the community in this regard. Similarly, supplementary stints of observation were used to check whether the use of mixed codes might have been underreported in the questionnaires.

In short, then, a questionnaire survey was deemed a suitable methodology to study code choice at Vienna Bilingual Schooling, especially if complemented to a certain degree by more ethnographic approaches. As far as formal considerations go, I followed design guidelines in Dörnyei (2003: 19ff) and Wray, Trott \& Bloomer (1998: 179ff), for instance by printing the questionnaires in the form of a four-page booklet. This not only prevents lost pages should they become unstapled, but more importantly limits the scope to manageable proportions. An initial trial run with a limited number of students confirmed that the questionnaire could be completed in the thirty minutes allocated by school authorities, ${ }^{35}$ and beside a slight change in the wording of one minor question, no other changes were necessary. An example of the questionnaire as used in the remainder of the study can be found in APPENDIX A. The version reprinted here is the English one, but in order to eliminate any possible sociolinguistic influence on the respondents, 50 percent of the questionnaires were printed in each of the languages (i.e. English and German), after which all were thoroughly shuffled and distributed at random. ${ }^{36}$

[^24]So as to minimize variability in the external setting between the several groups of respondents, the questionnaires were always administered during school hours, and in each instance by the researcher himself. This would also help with the reliability of the results, because of a reduction in age and power mismatch (Wray, Trott \& Bloomer 1998: 178) between the respondents and the interviewer. ${ }^{37}$ In explaining the procedure, I chose to switch between English and German, so as not to prejudice the results through my own linguistic choices. Given that the respondents are used to code switching between these two languages, it was judged that this would not compromise comprehension of the task, while I would maintain neutrality with regard to the dependent variable of my research.

The internal structure of the questionnaire consists of three parts, eliciting in turn information on the socio-linguistic background of the respondents, the dependent variable of language choice (PART A), and certain linguistic and sociocultural attitudes (рart b). The introductory section thus collects social background data on all the respondents. Students were asked to list, in as much detail as possible, their native language(s) and the languages they regularly use in the home. Gender was another item in this section, and at the end I asked respondents to indicate which schools they had attended at the elementary and lower secondary levels. ${ }^{38}$ How these brief sociolinguistic histories at the beginning of each questionnaire were transformed into categorical, and hence quantifiable, data is discussed in the coding scheme (section 3.3.3). PART a of the questionnaire represents the actual survey of the dependent variable. As for the exact wording of the question respondents were asked, the reader is referred to the questionnaire in APPENDIX A, which contains a detailed description of the task. Essentially, what I asked respondents to do was to imagine an informal

[^25]conversational setting involving themselves and each of their classmates, and to mark on a scale which language, or combination of languages, they would be using in each constellation. What might be noted here is that contextual factors are relatively well circumscribed, and that the question about the dependent variable of language choice is phrased in a way that defines the interlocutor as the decisive factor. It must be noted that this is not to negate other possible influences on code choice (cf. Clyne 1997: 308f), but simply reflects the focus of my study, ${ }^{39}$ and assumptions about which line of analysis would be the most rewarding in the given setting. Nevertheless, to give respondents an opportunity to mention other elements that might influence their choices, a comments field was added to each item. This field also gave respondents the opportunity to mention languages other than English or German, if indeed such third languages were to constitute the primary medium of conversation for certain conversational pairings. A more in-depth discussion of the scale used for the dependent variable is part of the coding scheme. It is quite clear that outright anonymity is unachievable given the underlying structure of part a of the questionnaire. In consequence, I assured my respondents that all their data would be treated with absolute confidentiality, meaning I would not share their personally identifiable information with anyone else, especially their teachers, parents, or fellow students. ${ }^{40}$

The final section of the questionnaire (РАRT в) contains a number of multiple choice and open questions. Issues covered range from patterns in media consumption, attitudes towards code switching and code mixing, to an open question eliciting general attitudes and experiences with regard to bilingual education. Not all of the items in this section were transformed into quantifiable data. ${ }^{41}$ The others could be argued to form part of the qualitative element of this

40 For a further discussion of anonymity versus confidentiality, see Wray, Trott \& Bloomer (1998: 169).
41 Those that were are again addressed in more detail in the coding scheme in section 3.3.3.
study, which is discussed in greater detail in section 3.2.3. Before that, though, I would like to introduce the statistical method employed in the analysis of the quantitative data.

### 3.2.2 STATISTICAL METHOD: MULTIVARIATE ANALYSIS

The statistical method I employ in the analysis of my data is commonly referred to in the linguistic literature by three different names: VARBRUL (for variable rule analysis), multivariate analysis, and multiple (logistic) regression. Logistic regression is the most specific term and describes the maths behind the procedure as it is used in this study. VARBRUL is commonly used in the sociolinguistic literature, because it reflects the broader theoretical-linguistic underpinnings of the method, in that we try to establish a complex of (socio)linguistic rules that govern the speech of a population. It must be said, however, that the term rules has fallen out of favor with sociolinguists, who prefer to speak of conditioned choices instead (Tagliamonte 2006: 131). Multivariate analysis in my view best captures the essence of the procedure, viz. that multiple independent variables are analyzed concurrently (Stevens 2002: 91). Some statisticians suggest that a distinction could be made between multiple regression and multivariate analysis (Stevens 2002: 2, 80), with the two differing in the number of dependent variables analyzed. That said, this distinction is "more semantic [...] than substantive" (Stevens 2002: 2), and is not followed widely in the literature (Tacq 1997: 35). The important thing to remember is that multivariate analysis can be used as a cover term for several different statistical setups and procedures, of which logistic regression, as used in this study, is just one.

The motivation to use a multivariate approach stems from the very nature of the data themselves. In virtually all the sections of the theoretical review in section 2, it was mentioned that bilingualism and the related phenomenon of
code choice vary along multiple dimensions and many factors within each of these dimension. Certainly, it is possible in research to narrow down the scope of the inquiry to a very particular aspect of the object under investigation. In sociolinguistics, however, there is - almost by definition - an underlying desire to gain a more comprehensive picture of language in society. As a result, it often becomes necessary to collect information on a large variety of independent variables. However, with such a wide range of variables in hand, one encounters certain methodological problems in their quantitative analysis. First, it is not statistically immaculate to perform too many sequential tests on the same set of data without adjusting the rigor (in the form of the p-level, or $\alpha$-error) of each procedure accordingly (Woods, Fletcher \& Hughes 1986: 194). ${ }^{42}$ Additionally, one must expect to find relationships of non-orthogonality across combinations of these variables (and possibly even interaction), leading to serious caveats in the interpretation of the results. Multivariate analysis is a possible solution to this challenge, in the sense that the technique enables the researcher to consider several independent variables concurrently, while taking account of possible relationships of non-orthogonality in the data. In the following, I would like to briefly explain what a multivariate analysis using logistic regression looks like from a practical point of view. After that, I will discuss the two issues of nonorthogonality and interaction, and how each was addressed in my research design.

The most precise terminology for the procedure described here would be multiple logistic regression with a binomial step-up, step-down setup. The software utilized in this study is Goldvarb $X$ (Sankoff, Tagliamonte \& Smith 2005), a multivariate application developed in collaboration by linguists, mathematicians, and statisticians at several Canadian universities (Tagliamonte 2006: 128, 158). For a differently worded step-by-step explanation of the

[^26]procedure as it is performed by this software, see Tagliamonte (2006: 140ff). To start, I would like to break down the final results of this type of multivariate analysis. In essence, there are three important elements in the output (Tagliamonte 2006: 235), all of them related: a list of factors by relative effect size, information as to the significance of the factors, and a constraint ranking for the different levels within each factor. The constraint ranking is the order of the various levels of a factor by factor weight, which in turn can be conceived of as "the probability [...] that the application value will occur in th[e particular] context" of a specific factor level (Tagliamonte 2006: 156). In simple terms, the factor weight is simply a measure of which realizations of an independent variable favor, and which disfavor a specific outcome in the dependent variable. The range is the difference between the highest and the lowest factor weights within the levels of a factor, and it is this range which ultimately determines how the factors are ranked in terms of effect size. Significance, finally, is related to the other measures in that a small range within the levels of a factor will at a certain point - depending on the specific size and nature of the sample - no longer be statistically significant. However, we must bear in mind that a very large sample will identify as significant even minute effect sizes, ${ }^{43}$ whereas a smaller sample will sometimes fail to identify relatively large ranges as significant. Therefore, Tagliamonte (2006: 237) suggests that all factors, whether identified as significant or not, should be quoted in the results together with their factor weights. It is then possible to look at the constraint ranking within non-significant factors - checking whether they are in line with hypotheses - to establish whether these factors might be rewarding elements in future research in the field. ${ }^{44}$

[^27]Initially, the software starts calculations as would be expected - by separately testing how well each independent variable can account for the pattern in the dependent variable. Naturally, one of the factors will have the most explanatory power with regard to the dependent variable, and it is this variable that is selected for inclusion in the model at this initial stage. For practical purposes, we should assume that at least one variable has an explanatory power beyond the .05 threshold. ${ }^{45}$ In the second step, each remaining variable is independently entered into a model together with the lone factor selected in the first step. The criterion now is not whether this new variable can explain a significant amount of variation in the dependent variable on its own terms, but rather whether it can improve the model as a whole significantly. Should this, more stringent criterion, again be met by several variables, the one that improves the model the best will be selected as the second factor. This procedure is carried on as long as there remain new variables that can add significantly to the explanatory power of the model. At each step, the program adjusts the factor weights of the already established variables to account for the newest one added. Once a point is reached where no new variables can significantly improve the overall model, the procedure stops, since it has identified the best step-up run. This run is the basis for the multivariate model, which consists of all the factors identified as significant, together with their most recent factor weights. However, the application still performs a step-down, which is a simple reversal of the step-up procedure. Now, the software starts with a model in which all the factors are included, then starts to eliminate factors which, if lost, do not significantly diminish the explanatory power of the model. Again, we will reach a point at which each remaining variable, if it were to be eliminated, would significantly subtract from the power of the model: the best step-down run. The step-down procedure has two important functions: first, the initial run of the step-down, in

[^28]which all of the factors are forced into the model, is used to extract the factor weights for the variables not identified as significant in the best step-up run (Tagliamonte 2006: 237). Second, the best step-down run should contain the same variables and approximate factor weights as the best step-up run (Tagliamonte 2006: 145). By this token, the step-down procedure provides a check on the viability of the model from the best step-up run. From the foregoing description, it will already be clear that a multivariate analysis presents a methodological improvement over uncoordinated tests on several independent variables with regard to the same dependent variable. To flesh out the nature of these improvements, and to provide a frame of reference for the interpretation of a multivariate model, it is useful to discuss the concept of multicollinearity.

Multicollinearity, or non-orthogonality of independent variables, is a scenario very common in the social sciences, linguistics, and surveys involving cognitive measurements more generally (Tagliamonte 2006: 132, Stevens 2002: 91). The term describes situations in which there is "a strong correlation between two or more predictors in a regression model" (Field 2005: 174). On a practical level, there could be two sources for such a relationship: sampling variation or a correlation in the underlying population. As the sample grows, the correlations should naturally tend towards the population values. Still, natural data ${ }^{46}$ always contain "'lumps' and 'clumps', 'hollows' and 'dips'" (Tagliamonte 2006: 139), and will hardly ever be neatly stratified according to all the factors. This becomes especially true as the number of independent variables increases. It has already been mentioned that multivariate analysis calculates factor weights for the levels within each variable. These numbers often behave in a fashion parallel to the percentages or fractions of a simple distributional analysis. The difference between the figures is exactly that account has been taken of the independent

[^29]variables' correlations in the factor weights. Factor weights, then, are an idealized measure of the effect of an independent variable - a measure in which the effects of all cross-cutting factors (the covariates) have been filtered out. What exactly does this mean in terms of interpretation? First, one should bear in mind that with the large sample sizes usually used in multivariate analysis, some correlations might well be present in the overall population, not just the sample. What multivariate analysis then does is return a model in which the factors are considered "independent in principle" (Tagliamonte 2006: 139), not necessarily in actual fact.

As a practical example, one could take an analysis which contains as independent variables the age of respondents and their income level. In many societies, these two variables will be related, with older, more experienced workers generally commanding a higher salary. If the two factors were investigated independently, part of the effect of age could be a covariate effect of income level and vice versa. In a multivariate analysis, the two factors and their factor weights are orthogonalized (made independent 'in principle'), meaning the effects of the covariates are disentangled.

There is a practical problem, however: as multiple regression tries to account for the effects of covariates, it will in many cases be more difficult to obtain significant results, as well as large effect sizes in groups of factors that are more than moderately correlated. Indeed, if they are highly correlated, it might prove difficult to obtain meaningful results from a multivariate design altogether (Stevens 2002: 92). In the final analysis, the various variables would merely be different labels for the same effect, at least statistically speaking, because the two strongly correlated factors account for almost the same variability in the dependent variable. The software will, in such cases, be at a loss to determine which of them to give credit for the effect observed in the dependent variable. Luckily, the statistical literature is quite reassuring with regard to this
issue: multicollinearity is considered problematic if a correlation between variables exceeds (depending in the source consulted) ".70" (Stevens 2002: 93) or ". 80 or .90 " (Field 2005: 175). This high threshold explains why multivariate analysis is such a widespread tool in the social and cognitive sciences, despite the fact that low to moderate correlations between independent variables must usually be expected. But even with much lower correlations, it has to be taken into account in the subsequent discussion of a multivariate analysis that the factors have been orthogonalized, i.e. that they have been rid of any influences from cross-cutting factors.

A final issue that should briefly be addressed in this section is that of interaction. Interaction is present in a set of data if
for one dependent variable $Y$ and two independent variables $X$ and $Z$ [...] the causal effect of $X$ on $Y$ is different for different categories of Z. (Tacq 1997: 43)

Put in slightly less abstract terms, interaction means that the effect of one independent variable is completely reversed as the realization of another independent variable changes. This is more consequential, Tacq (1997: 43) notes, than mere multicollinearity. The issue needs to be mentioned because, by design, multiple regression is not structurally geared towards identifying interaction (Tacq 1997: 41, Tagliamonte 2006: 151). On a practical level, however, the variables in my analysis did not warrant the assumption of widespread interaction. In one instance, a workaround in the form of amalgamation of variables was used (cf. Tagliamonte 2006: 157, and the more detailed discussion in the coding scheme). Additionally, the analysis was checked for certain posthoc flags (Tagliamonte 2006: 151, 229) that are indicative of interaction. ${ }^{47}$

[^30]
### 3.2.3 QUALITATIVE DATA AND CONTROLS

As mentioned above, PART B of the questionnaire contained several open questions that were not transformed into quantitative data. Among these were questions relating to code switching and attitudes towards this practice, as well as a final essay question that asked respondents to reflect on their experiences at Vienna Bilingual Schooling. Open questions of this sort were introduced to provide a more holistic (ethnographic) view of the target population.

A similar function was served by a longer group interview conducted with a number of students. In addition, this interview allowed me to ask questions too complex for the questionnaire format, or that were simply left out of the general survey because of time constraints. Both of these methodological additions were designed to yield data complementing the quantitative analysis, intended mostly to provide an underpinning for the discussion and interpretation of the numerical results.

A final ethnographic method, observation, was employed to ensure that the findings of the survey comported with natural data. Observation was possible in most classes before and after the questionnaires were handed out. In addition, I accompanied a short field trip of one of the classes. This was before any questionnaires had been handed out to the respective students, so at that point they did not know in any detail what the focus of my research was. I kept my own interaction with the students to a minimum on this occasion so as to minimize the effects of the observer's paradox. On another occasion, I had the opportunity to observe classroom discourse, and informal conversations between students and teachers (as well as among teachers). While these latter forms of discourse were not the primary focus of my research, observing them nevertheless gave me a better understanding of the larger social context of Vienna Bilingual Schooling.

### 3.3 Hypotheses, data, coding scheme

### 3.3.1 HYPOTHESES

German was identified as the dominant language in informal conversations at Vienna Bilingual Schooling in the studies of Hüttner (1997: 160) and Gräll (1999: 132), who studied the elementary and lower secondary levels, respectively. As the demographic make-up of the student population and the wider socio-cultural setting were diagnosed as the main components behind this pattern, there is some reason to believe that it will be found replicated at the upper secondary level.

The main thrust of this study is to test which independent factors can be identified as responsible for the patterns in the variable of code choice. In other words, there is an assumption that not only the home language background plays a role, but also factors such as gender (constellation), educational background, and attitudinal factors. Which variables were specifically entered into the multivariate analysis, and how they were extracted from the questionnaire data, is discussed in detail in the coding scheme (section 3.3.3). In most cases, the expected effect of variables will be quite self-evident, and since there is no directional testing involved in my analysis, there is no need to formulate more rigid hypotheses. If further comments are warranted, these will be part of the coding scheme. Before I move on to this section, however, I would like to discuss in more detail the nature and overall distribution of my data.

### 3.3.2 THE NATURE OF THE DATA

During the gestational phase of my project, I contacted all the schools in the city that offered Vienna Bilingual Schooling at the upper secondary level. I received positive responses from the two mentioned in section 3.1, and went on to plan
and coordinate my field work with the respective administrators. Knowing little about the response rate to be expected, I undertook to distribute as many questionnaires as I could. After all, the possibility to maximize the sample size is an important strength of the survey methodology. Overall, I had an excellent response rate and almost 500 usable questionnaires could be collected from students in eleven classes. Beyond mere quantity, however, there were two additional considerations that supported the idea of conducting the survey at both schools. The first was to widen the base in terms of the results' wider generalizability. ${ }^{48}$ Second, there seemed to be the possibility of a rewarding comparison between the two schools, especially because they had slightly differing curricula, viz. one with a focus on business education, the other without such a specialization. Alas, field work, like politics, is always the art of the possible, and the data were not distributed well enough to warrant such a comparison. While at one school, administrators provided a tight timetable and requested the various teachers' cooperation, those at the other school said permission and coordination would have to be with individual teachers. Not surprisingly, teachers were much less cooperative under these latter conditions, and I had to contend with a considerably smaller sample. The question then became how to select the final sample, or set of tokens, for analysis. It must be noted that the statistical population for my study were conversational pairings, not individuals. With almost 500 questionnaires from eleven classes in hand, coding all possible conversational pairings would have been neither feasible nor very useful methodologically, considering the maldistribution between the two schools that was mentioned. Ultimately, I decided on a combination of stratified and random sampling (Tagliamonte 2006: 23) in selecting the final data set of 1267 items (i.e. directional conversational pairings). Stratification was applied in

[^31]the sense that approximately half of all the tokens were selected from each school (to make the sample as representative as possible), and at the first school, where this was possible, about an equal number came from each of the various grades (again, to have a good cross-section of the various grades). Beyond that, the selection of items was conducted at random.

The fact that for each conversational pairing both participants indicated their predominant language of conversation leads to two interesting questions: first, how well do the responses from each conversational pairing match up? And in those cases where they do not, what is an appropriate explanation for the discrepancy? Looking at the five options given in the questionnaire (see section 3.3.3 for more detailed discussion), it could be said that any two adjacent categories do not represent a very marked contrast, and differing responses within that range could easily be attributed to slightly different perceptions or interpretations of the scale. Any discrepancy of more than a category, however, would be quite marked, and thus warrant further scrutiny. However, of the approximately 600 conversational pairings represented by the coded tokens, only 29 exhibited a discrepancy of more than a category on my 5-point scale. This number corresponds to less than 5 percent of the data, meaning there was remarkable congruence in the language(s) reported as used by each conversational pairing. ${ }^{49}$ This in itself already represents an important finding, which will be commented on further in the discussion of my results. From a methodological point of view, it was judged that those few marked discrepancies that did exist in the data more likely represented mis-reports rather than actual instances of non-convergence. This conclusion was reached both on grounds of their patterning, and based on my own observation of informal conversations between students. This, together with their small number, made a convincing

[^32]case for the exclusion of the 29 respective tokens from further quantitative analysis. To provide some baseline information for the now following coding scheme, I would like to give a table with the distribution of the dependent variable of language choice.

Overall distribution of the dependent variable [LANGUAGE CHOICE].

## Total N

|  | $\%$ | N |
| :--- | ---: | ---: |
| mostly English (E) | 5.1 | 64 |
| English with some German (e) | 8.9 | 113 |
| about equal amounts (5) | 3.9 | 49 |
| German with some English (g) | 11.7 | 148 |
| mostly German $(G)$ | 70.5 | 893 |

As one can see, an overwhelming number of conversational pairings use German in informal interactions. This is very much in line with the findings of Hüttner (1997: 119) and Gräll (1999: 133), who both arrived at very similar numbers. Which factors are responsible for this overall distribution is the focus of the multivariate analysis in section 3.4.1. The ensuing coding scheme lists in detail the variables that were entered into the analysis, and how they were extracted from the questionnaire data.

### 3.3.3 CODING SCHEME

This section lists all the variables that were entered into the multivariate analysis, detailing in each case how they were extracted from the questionnaire data. The variables that will be covered are:
[LANGUAGE CHOICE] (dependent variable)
[HOME LANGUAGE BACKGROUND fo
[EDUCATIONAL LANGUAGE BACKGROUND]
(independent variables)
[GENDER CONSTELLATION]
[MEDIA LANGUAGE PREFERENCE SCORE]

As the discussion proceeds, there will be space to mention some other variables that might have been entered into the analysis, but for either practical reasons or theoretical concerns were omitted.

## The dependent variable, [LANGUAGE CHOICE]

In the questionnaire, respondents were given a 5-point scale to report on the dependent variable of language choice, which is relatively fine-grained. The outer four categories correspond to a scale suggested in Grosjean (1982: 129), who writes that in conversations between bilinguals (in the widest sense) either of the two languages can be employed, each time with or without code switching to the other language. The added middle category, on the other hand, could be considered to be representative of "CS itself as the unmarked choice" (Myers-Scotton 1993: 117). The preceding section mentioned how accurate judgments were apparently still easy to arrive at for the respondents, and how

[^33]the data patterned on this detailed scale. However, the multivariate statistics of the software GoldvarbX only allows for a binary opposition in the dependent variable. This should not necessarily be interpreted as a deficiency, as "[a] binary opposition makes a stronger linguistic hypothesis" (Tagliamonte 2006: 157). In other words, a fine-grained variable might be a more accurate representation of the often 'messy' natural data, but we are losing the generalizations that are the aim of quantitative analysis. Especially for a variable such as language choice, a binary opposition is not difficult to arrive at. Nevertheless, presenting respondents with a more detailed scale on the questionnaire allows to carve up the data in various ways for analysis. Ultimately, I decided to make use of this fine-grained scale in the analysis by running two distinct multiple regressions: one main analysis in which the binary opposition is between English and German, and a second, complementary one, in which I tested for mixed codes.

Analysis A, English vs. German

- (mostly English) or (English with some German) or (both equally) -> application value ${ }^{51}$
- (mostly German) or (German with some English)

In the preliminary distributional analysis, we saw that the data very much gravitated towards the German end of the spectrum. Additionally, the middle category is especially rare. In a multivariate design, the task of arriving at a viable model becomes more taxing and difficult for the software as the distribution becomes more uneven (Tagliamonte 2006: 154). In the instant case, there is no reason not to group together the realizations (E), (e), and (5), as long as we remember in the discussion of the results that that was the contrast used. In effect, we will therefore analyze the use of English, mostly English, or equal amounts of English and German with the use of German or mostly German.

[^34]Because of the overall distribution of the data and the extremely low incidence of category (5), it will not lead to grave distortions if we nevertheless refer to this contrast as 'English versus German'.

Analysis B, mixed codes

- (English and German equally) or ( $G$ with some $E$ ) or ( $E$ with some $G$ )
-> application value
- (mostly English) or (mostly German)

In this second, complementary analysis, the spectrum is divided symmetrically, but with the ends constituting a joint category. The three central categories that involve moderate to high amounts of code switching represent the application value. The purpose of this analysis is to test which external factors have a bearing on the use of mixed codes.
[HOME LANGUAGE BACKGROUND] (speaker/addressee)

The questionnaire allowed the respondents to distinguish between their native language(s) and home language(s). However, since very little use was made of this distinction, i.e. native and home language(s) were given as equivalent in almost all cases, the two categories were collapsed in the analysis. The way the variable was coded allowed for monolingual, bilingual, and even tri-lingual language backgrounds. ${ }^{52}$ Given the way the data was elicited, it was possible to code both for the language background of the respondent, and the linguistic background of the imagined interlocutor for each item. Because multivariate analysis is a procedure that focuses on main effects, and does not, on its own, allow for the easy investigation of possible interaction between various

[^35]independent variables (Tagliamonte 2006: 151) some consideration must go into the way in which those variables are coded which might show important patterns of interaction. For instance, it would have been possible to collapse the linguistic backgrounds of respondent and putative conversational partner into one variable, allowing for easy investigation of any possible interaction. However, the multiplication of factor levels this would have led to was deemed too large a trade-off in this specific case, meaning that the language backgrounds of speaker and addressee were coded as separate variables, and that we will investigate their main effects only. There is additional justification for this setup in that a strong interaction between the two factors, meaning one that would render the results of a main effects analysis mute, is highly unlikely.

The two factors have the following possible levels:

- German, (G)
- English (E)
- German-English bilingual (B)
- German and a third language (g)
- English and a third language (e)
- German, English, and a third language (3)

In the bilingual and trilingual realizations of the variable, no ranking is implied in the order of the languages, and only languages that were reported by the respondent as used frequently were taken into account. Instances in which the respondent wrote that he or she used a certain language when visiting relatives abroad, or very sporadically at home (e.g. in a jocular manner) were not deemed sufficient grounds for inclusion of the respective code in the home language profile.

Only the educational background of the speaker was coded for. The questionnaire asked subjects about their educational history with a particular view to the language(s) of instruction. The responses were categorized into the following factor levels for the purpose of multivariate analysis:

- German or mostly German (G)
- English or mostly English (E)
- German-English bilingual instruction (B) ${ }^{53}$
- previous instruction mostly in a third language (o)


## [GENDER CONSTELLATION]

For gender, similar considerations came into play as with the variable of linguistic background, since the gender of both speaker and addressee, and any possible interaction between the two, had to be taken into account. For instance, it is conceivable that female speakers might favor one variety in interactions with other females, but not when speaking to males - a clear interaction if the genders of the two conversational partners were coded as separate variables. So as not to lose such effects in the multivariate analysis, gender constellation rather than gender (of speaker and interlocutor) was coded for. Unlike in the case of linguistic background, the resulting collapsed variable is still very manageable, exhibiting only four levels:

- female student addressing female student (F)
- female student addressing male student ( f )
- male student addressing female student (m)
- male student addressing male student (M)

[^36]
## [MEDIA LANGUAGE PREFERENCE SCORE]

While some questions in PART в of the questionnaire were open in nature and therefore purely qualitative, several items could be transformed into quantitative data. This includes the section on media language preferences, the section on the predicted importance of languages in respondents' private and professional lives, and the section on self-assessed or perceived language competence. Certainly, all of these variables would have made for interesting hypotheses in terms of their influence on language choice, and all were originally coded for. In a multivariate design, however, once the variable count exceeds a certain number, the strain on computational resources becomes quite marked, and processing time rises exponentially with each new variable added (especially if the factors within themselves have as many as six levels). The other challenge is that we must expect relatively high intercorrelations between perceived language competence, media consumption, and predicted dominant language in the home or on the job. This is the problem of non-orthogonality or multicollinearity in a multivariate design which was discussed in the methodology section. For both of these reasons, only one of the three variables, the media language preference score, was ultimately entered as a factor in the analysis. The reason for this was that it exhibited the most heterogeneous patterning, while the other two items were answered very similarly by most of the respondents. ${ }^{54}$

The section on media language preferences contained three questions, each of which could be answered on a three-point scale, with points from zero to two awarded depending on the preference stated. The resulting variable is a score for each respondent ranging from zero to six, with a lower number indicating a preference for German, and a higher number a preference for English. For easier reference, and in the interest of limiting requirements on computational

54 For instance, most respondents with a German home language background said that German would be the dominant language in their future private lives, but both German and English in their future professional lives. Since there is little variation in the responses, the variable would have added little explanatory power to the model.
resources, the scores were amalgamated in the following way in the multivariate analysis:

- preference for German (G) [0-2 points]
- balanced score (B) [3-4 points]
- preference for English (E) [5-6 points]

It has already been mentioned that I did not compare the two different schools represented in my data, because the data was not distributed evenly enough. One further variable that I had originally envisaged as a possible candidate (and had coded for) had to be omitted in the analysis: the year each respondent was in. Here, too, the reason is a distributional problem: in a multivariate design, all the cells in the analysis have to be greater than zero, i.e. there has to be at least some variation with regard to all the levels of a factor. For one year, there was no variation, as all the respondents in that class conducted their conversations (mostly) in German. Workarounds for this problem would have existed, but since a distributional analysis by year did not point in the direction of any meaningful patterns, the variable was left out in the multivariate analysis.

### 3.4 Analysis

### 3.4.1 MULTIVARIATE ANALYSES

As laid out in the coding scheme, this section consists of two multivariate analyses, one focusing on the contrast between English and German, the other on the occurrence of mixed codes. The complete output of both analyses can be found in appendix b.

The table format follows the suggestions in Tagliamonte (2006: 247). The first column gives the factor weights, which are the result of the multivariate analysis and the basis of the constraint ranking. The other two columns give conventional descriptive statistics to give a better understanding of the distribution of the data and to help in the interpretation of the factor weights. The important thing is that the percentage column gives the ratio of applications in the respective group, while the final column gives the overall N for each factor level, not just the number of applications. Put more technically, the first two columns of factor weight and percentage refer to the application value, whereas the final column counts all items. As a logical consequence, the percentages in column two do not add up to 100 percent, while the N's in the final column should approximately add up to the overall sample size. The reason why this is not always exactly so is that sometimes respondents left out certain fields, so that their item had to be excluded from the calculations of the factor weights of a specific independent variable. For instance, some students omitted the question about their educational background, or provided incomplete data. In GoldvarbX, such items can still be included in the overall analysis, but are left out in the calculations of the factor weights of the missing independent variable (Tagliamonte 2006: 178). That is the reason why some factors have slightly lower Ns than the complete dataset. The multivariate table starts on the following left page for easier readability.

Multivariate analysis of several sociolinguistic factors hypothesized to influence code choice in informal conversations among students at Vienna Bilingual Schooling (upper secondary level). Factor groups not selected as significant in square brackets.

|  | Analysis A: English vs. German <br> application value: English |
| :--- | ---: |
| Corrected mean | .039 |
| Log likelihood | -241.79 |
| Total N | 1267 |

Factor weight $\%$

## Home lang. background of addressee

| (E) English only | .998 | 92.6 | 27 |
| :--- | :--- | ---: | ---: |
| (e) English and a third language | .983 | 68.6 | 121 |
| (o) a third language | .975 | 54.5 | 55 |
| (B) English-German bilingual | .695 | 21.2 | 76 |
| (3) English, German, and a third language | .588 | 14.5 | 99 |
| (g) German and a third language | .394 | 9.3 | 226 |
| (G) German only | .215 | 5.0 | 663 |

## Home lang. background of speaker

(E) English only . 996

| 95.2 | 21 |
| ---: | ---: |
| 59.8 | 117 |
| 43.9 | 57 |
| 21.6 | 72 |
| 19.4 | 97 |
| 10.0 | 229 |
| 7.6 | 674 |

## Educational language background

| (o) other | .822 | 75.0 | 12 |
| :--- | ---: | ---: | ---: |
| (E) English | .772 | 53.0 | 100 |
| (B) German-English bilingual (mostly VBS) | .617 | 22.1 | 485 |
| $(G)$ German | .350 | 5.7 | 600 |

## Media language preference score

| (E) 5-6 points, preference for English | $[.596]$ | 30.0 | 266 |
| :--- | :---: | :---: | :---: |
| (B) 3-4 points, balanced consumption | $[.475]$ | 14.3 | 638 |
| (G) 0-2 points, preference for German | $[.428]$ | 9.0 | 363 |

## Gender constellation

| (f) female, addressing male | $[.609]$ | 16.2 | 260 |
| :--- | :--- | :--- | :--- |
| $(m)$ male, addressing female | $[.522]$ | 16.6 | 241 |
| $(M)$ male, addressing male | $[.466]$ | 13.3 | 128 |
| $(F)$ female, addressing female | $[.454]$ | 19.6 | 638 |

Before discussing the actual results of the multivariate analysis, it might be useful to look at the simple descriptive statistics of the population that can be read off of the final column, without even considering any effects on the dependent variable. For the first two factors, these descriptive statistics show that German home language backgrounds dominate, constituting more than 50 percent of the sample, even if monolingual German backgrounds (G) are contrasted with all others combined. German educational backgrounds, too, predominate, representing about 51 percent of the sub-sample of those questionnaires where this factor could be coded. Around 40 percent are represented by previous educational backgrounds at Vienna Bilingual Schooling, 8 percent by Englishlanguage educational backgrounds, and 1 percent by previous schooling mostly in a third language. The distribution for the media language preference score approximates a bell-curve, ${ }^{55}$ whereas the descriptives for the gender constellation reveal that females are far more numerous in the student population that was studied, outnumbering males by approximately seven to three. ${ }^{56}$ With these basic distributional data in mind, it is possible to move on to the multivariate analysis itself.

55 This could be expected for the only variable that has an interval rather than a nominal scale.
56 ( F ) and ( f ) combined versus (M) and (m) combined. This statement about the student population is, of course, an extrapolation based on the statistical population of conversational pairings.

Not surprisingly, the most prominent factors in the multivariate model are the home language backgrounds of speaker and addressee. That these two factors exhibit very similar effect sizes and factor weights naturally follows from the observation made earlier that each conversational pairing arrives at a relatively uniform code. The ranking of the factor levels within each factor very neatly mirrors expectations. Expressed verbally, we could say that the more German is used in the home, the higher the likelihood that it will be the dominant code choice in informal conversations at school. The less self-evident, and therefore more consequential part of this statement is that the converse is not as accurate a description of the pattern. This is because third language speakers pattern with English home language backgrounds, and less with German-English bilingual speakers or German speakers. To explain this particular pattern, the discussion will in more detail look at the linguistic biographies of speakers of the thirdlanguage group.

Following the home language backgrounds, the next variable in the constraint ranking is the educational language background. Again, the constraint ranking is quite straightforward and unsurprising, except maybe for the fact that the highest factor weight is represented by educational backgrounds were instruction was mostly in a third language, other than English or German. This observation links up with the one just made with regard to the factor weights of third-language home language backgrounds. Again, a closer look at individual biographies of this group later in the discussion will help explain this pattern.

Finally, two factors were not identified as significant in the multivariate analysis: the media language preference score and the gender constellation. In the constraint ranking, the media language score comes before gender constellation. Moreover, the patterning of the factor levels of the score follows the natural hypothesis, with a preference for English leading to a more frequent usage of the language. There is thus some indication that an effect exists, but that its
magnitude is too small to be picked up in the analysis. A prime factor in this might be that there is considerable covariance between this variable and the three dominant ones above it in the constraint ranking. A student who uses English as one of her home languages is also likely to consume more Englishlanguage media. The reduced factor of multivariate analysis, in which the effect of all the previously chosen factors has been filtered out, is then no longer able to account for enough additional variability to be included in the model. Nevertheless, the neat pattern suggests that a scale of media language preferences might well yield statistically significant results under slightly different circumstances.

Gender constellation, on the other hand, is not only the factor with the least explanatory power in statistical terms, but also exhibits a constraint ranking that would be difficult to explain on theoretical grounds. What is more, this is the only factor where the factor weights are at odds with the raw percentages, ${ }^{57}$ so that there is no indication in the data that would suggest the differences in this variable are anything but random fluctuation.

In the following, I would like to move on to the analysis of mixed codes, which again starts on a left page for easy readability.

[^37]Multivariate analysis of several sociolinguistic factors hypothesized to influence code choice in informal conversations among students at Vienna Bilingual Schooling (upper secondary level). Factor groups not selected as significant in square brackets.

|  | Analysis B: mixed codes <br> application value: all mixed codes |
| :--- | ---: |
| Corrected mean | .173 |
| Log likelihood | -566.09 |
| Total N | 1267 |

Factor weight $\%$

## Home lang. background of addressee

| (e) English and a third language | .774 | 46.3 | 121 |
| :--- | :--- | :--- | ---: |
| (3) English, German, and a third language | .704 | 36.4 | 99 |
| (E) English only | .696 | 37.0 | 27 |
| (o) a third language | .665 | 30.9 | 55 |
| (B) English-German bilingual | .638 | 27.6 | 76 |
| (g) German and a third language | .496 | 18.5 | 227 |
| (G) German only | .215 | 11.9 | 664 |

## Home lang. background of speaker

(e) English and a third language . 693

| 43.6 | 117 |
| ---: | ---: |
| 33.3 | 57 |
| 26.4 | 72 |
| 33.3 | 21 |
| 17.0 | 230 |
| 15.7 | 675 |
| 20.6 | 97 |

## Gender constellation

| $(M)$ male, addressing male | .613 | 26.9 | 130 |
| :--- | :--- | :--- | :--- |
| $(F)$ female, addressing female | .532 | 23.4 | 638 |
| (m) male, addressing female | .439 | 15.8 | 241 |
| (f) female, addressing male | .421 | 15.0 | 260 |

## Educational language background

| (o) other | .782 | 58.3 | 12 |
| :--- | ---: | ---: | ---: |
| $(E)$ English | .614 | 36.6 | 101 |
| $(B)$ German-English bilingual (mostly VBS) | .540 | 23.9 | 485 |
| $(G)$ German | .442 | 13.5 | 601 |

## Media language preference score

| (E) 5-6 points, preference for English | $[.548]$ | 29.1 | 266 |
| :--- | :--- | :--- | :--- |
| (B) 3-4 points, balanced consumption | $[.483]$ | 17.7 | 639 |
| (G) 0-2 points, preference for German | $[.474]$ | 15.8 | 364 |

Four of the five factors were identified as significant in this second analysis: the language backgrounds of speaker and addressee, the gender constellation, and the educational language background. Not too much needs to be said at this point about the three factors that were significant in the previous analysis. Given that, generally speaking, there are many conversational pairings that exclusively rely on German, but very few that rely exclusively on English, plus the fact that the code spectrum was not divided absolutely evenly in the first analysis, ${ }^{58}$ it is not surprising that, on the whole, those language backgrounds that had high factor weights in the first analysis also received relatively high scores in the second. The most predictive variable selected by multivariate analysis, the home language background of the addressee, shows an especially neat pattern. For instance, (E) has been demoted in favor of (e) and (3), most probably because this addressee group accounts for the few pairings where the unmarked code is English only. Interestingly, the factor level (o) again has a very similar factor weight to (E), something that will be picked up in the discussion. The home language background of the speaker comes second in the constraint ranking, but we must note that this time the range of the factor weights, in other words the effect size, is smaller than before. Moreover, this is the only significant factor out

58 The few instances of the middle category being grouped with English.
of both analyses where there is slight mismatch between factor weights and raw percentages, especially with those groups based on smaller Ns. ${ }^{59}$ Very likely, this is the result of a slightly higher number of mis-matched conversational pairings compared to the first analysis. Whereas the main analysis divided the data along a very natural fault line provided by the almost non-existent middle category, the second analysis could not rely on such an obvious pattern in the data.

Gender constellation was identified as the third significant factor contributing to the extent of code switching. This is in conspicuous contrast with the first analysis, which did not identify gender constellation as a significant factor. Looking at the factor weights more closely, they clearly suggest that intra-gender conversations favor code switching, while inter-gender interactions disfavor the practice. ${ }^{60}$ It is certainly interesting to note that gender does not seem to affect the choice of language, but that the gender constellation appears to affect the amount of code switching.

As in the previous analysis, the media language preference score is not a significant factor. Again, this is likely the result of covariance between this factor and some of the stronger variables. As for the constraint ranking, the comments made with regard to the home language backgrounds and the educational background apply.

### 3.4.2 THE QUALITATIVE DATA

Before moving on to the discussion of the results, I would like to say a few words about the non-quantitative data. As will be remembered, qualitative data were part of my study in three guises: observation, open questions in the questionnaires, and interviews.

[^38]As far as observational data is concerned, its main purpose was to impressionistically corroborate the much more detailed findings of the questionnaire study. In other words, the aim was to exclude the possibility that the quantitative study suffered from widespread and consistent misreporting, something which would, quite obviously, seriously hamper the reliability and usefulness of the quantitative results. From my observations while administering the questionnaires and while accompanying a field trip, I can assert that the data from the quantitative study seems to accurately reflect usage in informal conversations among the students. There was nothing to suggest that the quantitative data is substantially flawed in any way, neither with regard to the overall distribution between English and German, nor with regard to the frequency of mixed codes.

The qualitative data from the questionnaires and the interview had a somewhat different function in my research design: they are meant to support the argumentation in the discussion of the quantitative results. In the following section, I will introduce some of the comments made on the questionnaires and in the group interview, linking them to specific findings from the quantitative analysis. In addition, interviewees (as a group) were asked to compile a very simplistic social network diagram of their class. The way the task was formulated to them was that they were asked to write down who was friends with whom, so there are only reciprocal links of equal strength in this simple model. The network has been visualized in appendix c, using the application NetDraw (Borgatti 2002). Based on information from the questionnaires, I have labeled each node with the home language background of the respective respondent, the abbreviations being the same as those used in the multivariate analysis. In addition, two focal points, S1 and S2, have been identified for subsequent discussion.

### 3.4.3 DISCUSSION

In taking stock of the data (section 3.3.2), the very first observation concerned the congruence of the codes reported by conversational pairings. This fact was interpreted, in part, as a vindication of the research design, but beyond these methodological concerns, the observation has important sociolinguistic implications. First, we can say that there are well-established unmarked codes for almost all conversational pairings, in line with Grosjean's (1982: 308) assertion that "two bilinguals usually have an agreed-upon language of communication". Second, it can be argued that in informal conversations among students at Vienna Bilingual Schooling, these agreed-upon unmarked codes are mostly determined by the social backgrounds of speaker and addressee, rather than fine-grained contextual factors beyond the formal-informal (classroom/ non-classroom) distinction. After all, if more subtle contextual or domain-related factors did play a primary role, this would be reflected in a higher number of incongruities. Furthermore, the matching responses and the high response rate are evidence that these established unmarked codes are generally transparent to the members of the community. ${ }^{61}$ Finally, we can assert that psychological convergence is mirrored in linguistic convergence among the students at the upper secondary level of Vienna Bilingual Schooling. This last point means that social rapport is established through a common linguistic code This is the default scenario within speech accommodation theory, but differs from psychological convergence without linguistic convergence - a scenario reported by Hüttner (1997: 149) for some conversations among primary school teachers at Vienna Bilingual Schooling. ${ }^{62}$

[^39]Multivariate analysis established that of the various sociolinguistic factors, the home language backgrounds of the conversational partners were by far the variables most predictive of code choice. This, coupled with the overwhelming number of German-language backgrounds, means that few informal conversations are conducted in English. At this point, the question arises why this link between home language background and language choice is so strong. One reason often given is that of linguistic competence and corresponding communicative efficacy. Hamers \& Blanc (2000: 144) refer to this as the linguistic competence principle, which states that "the sum of the individual communicative competences of the interlocutors [should be] maximum". To a certain extent, this principle will be part of the underlying conditioning process in my data. Except in populations where most speakers are very balanced bilinguals, it must be expected to feature into the equation. Nevertheless, several arguments can be made in favor of a more complex process of conditioning, in which language competence is but one factor. Hamers \& Blanc (2000: 144) themselves name influences which can counteract the linguistic competence principle, among them social, situational, and discourse factors, as well as a desire to establish ethnolinguistic identities. In the case of my own data, some of these forces seem to play an important role, though they tend to reinforce rather than counteract choice processes based on the linguistic competence principle. ${ }^{63}$ That is to say, the strong link between home language background and linguistic choices seems to be attributable not merely to levels of language competence, but likewise to social factors, including issues of identity.

As a first argument in support of this hypothesis, I would like to quote the generally high competence of most students in both languages that I observed during the phase of my research. What is more, we have to consider that in the academic context, German-language students freely choose to participate in a
bilingual program. ${ }^{64}$ Extrinsic motivations, such as job prospects, can be assumed to play a role in such a decision. However, extrinsic motivation alone would probably be an insufficient basis to enjoy or succeed at Vienna Bilingual Schooling. Likewise, students will certainly be aware that using English outside of the classroom, too, would enhance their proficiency. Issues of language competence and minimization of cognitive strain cannot, therefore, be assumed to be the sole factor responsible for the strong link between home language background and language choice in informal conversations. Social and group dynamics, including issues of identity, must consequently be assumed to play an integral part in this relationship. Further evidence for this stems from a variety of sources.

One important line of evidence comes from the responses I received to certain open questions in the questionnaire, in particular items two and three on its final page (APPENDIX A). The two questions are mirror images of each other, asking respondents how they feel about native speakers of German conversing in English and vice versa. It could be argued that the way the two questions were juxtaposed made it likely that respondents - motivated by what could be termed linguistic political correctness - would give matching answers. A substantial number of respondents, however, gave reasoned arguments why one is different from the other. In virtually all of these cases, the use of German by Englishspeakers was deemed more acceptable than the reverse. The reason consistently given was that in Austria, German is the established language of day-to-day communication, so the use of English by German speakers would be odd outside of a specific circumscribed, formalized context. Thus, words such as weird,

[^40]ridiculous, embarrassing, and even stupid were all used to describe this linguistic pattern, e.g.
(S3) I think it's weird if people talk [E]nglish instead of German.
(S4) [I] find it rid[d]iculous unless someone that doesn't speak German is with them.

When the pattern was deemed acceptable, the predominant reason given by students was that it is a form of practice.
(S5) I think it is good for them to improve their [E]nglish.

Almost somewhat contradictory, comments in another vein stressed the conviction that a switch to a non-native language by two speakers of the same linguistic background is only acceptable if they possess native-like proficiency in the other code.
(S6) I think it's cool if their English is good but if they speak [...] bad English it's horrible to listen to.

In short then, attitudes towards this linguistic pattern were ambivalent at best.

The converse, however, i.e. the use of German by speakers of other languages even if they share greater competence in another code, is not necessarily against social conventions within the Austrian context. The same student as in a previous example described it the following way:
(S3) It depends on where they are. If they talk German in Austria [...] I feel it [is] polite and friendly, in other countries it would be strange in my opinion.

And (S6), who felt only German speakers with a very good command of English should use the language amongst themselves, said that the reverse is acceptable irrespective of language competence,
(S6) [...] because if they live in Austria they have to improve their German.

Another student makes a very similar point, writing that though she feels it is weird for German-speakers to use English in informal conversations, the converse is acceptable because non-native speakers of German need to practice the language so that
(S7) [...] they can speak the national language of Austria [my emphasis].

The very same student said that she had very positive attitudes towards Vienna Bilingual Schooling, as it helped her to improve her English, and that she was proud of what she had achieved there in terms of her own bilingual competence. Overall, it might be worth pointing out that in the final essay question, praise of the multicultural and multilingual nature of Vienna Bilingual Schooling was a persistent theme in the responses:
(S8) It might have increased my cultural understanding and made me spontaneous and open for differences.
(S9) As a result of the multi-cultural nature of the classes, I have learned tolerance and respect for other people and their cultures [my translation]. ${ }^{65}$
(S10) I have got to know many different cultures, and learned to express myself in more than one language [my translation].

[^41]It is therefore all the more interesting to note that, regardless of such international or multicultural orientations, the notion of territorial bilingualism is a deeply entrenched sociolinguistic norm. As I will argue at more length in the following section, the norm seems to be fairly persistent in the European context, even in the face of the spread of global English.

The many responses that described the use of English in informal conversations among German speakers as weird, embarrassing, or ridiculous, moreover point to the important relationship between code choice and identity. This became even more apparent in several other comments, one of which I found very evocative because of its eloquent use of code mixing. ${ }^{66}$
(S11) ...finde ich irgendwie wannabe... [punctuation: original].

Thus, the respective student feels that the linguistic pattern under discussion is indicative of a "wannabe" attitude. Transposed to the plane of social psychology, one could say that a desire to become a German-English bilingual, in the sense of somebody who uses English throughout a wide range of domains rather than just in a professional or educational context, is perceived as inauthentic - a clear pointer towards the importance of factors of identity in code choice. A very similar opinion was expressed by another student:
(S12) I think it's rather embarrassing, cause I don't know who they want to impress or what they want to prove by it [my translation].

Thus, if there is no justification on the grounds of the linguistic competence principle to switch to a non-native language in informal conversations, it conveys an attitude of aloofness and lack of solidarity for many respondents in my study.

[^42]Finally, I would like to quote one response that was very interesting because it did not express disapproval of the linguistic pattern in general, ${ }^{67}$ yet clearly showed the same concerns related to the important functions language plays with regard to group identity and solidarity.
(S13) I think it's good, as long as they don't make derisive comments about the German language [my translation].

Returning from these qualitative examples to the results of the quantitative analysis, further evidence for a considerable social component in the link between home language background and linguistic choices comes from the way the multilingual home language backgrounds pattern in the analysis (page 76). After all, both (B) and (3) language backgrounds have factor weights (and percentages) far removed from those of (e), (E), and even (o) language backgrounds, and quite close to those of speakers of German and another language. One of my interviewees was a German-English bilingual raised in accordance with the one-parent-one-language principle. She confirmed that, while proficiency certainly was not an issue for her, ${ }^{68}$ she considered herself among the "German speakers" in her class. Asked why that was so, the reason she gave was that she grew up in, and had lived in Austria all her life.

In a similar fashion, the frequency of trilingual home language backgrounds speaks to the social power of the German language in Austria. Students who reported this language background had often had a linguistic/educational background which started in an outer circle country (hence the use of both English and another language), but which came to include German once they moved to Austria. The fact that the German language is also partly adopted in the home by such families can best be explained by the presence of strong social

[^43]incentives to adopt this language. I did not have a chance to interview a student with such a language background about their linguistic self-perception, but those classmates that I interviewed confirmed that many of these students were actually "German speakers" in their books. ${ }^{69}$ In general, it is interesting to note that languages other than English or German did not register in the quantitative analysis. This is because there was only a very low number of pairings who reported third languages as being used in their conversations, and in almost all cases this meant in addition to German and/or English. Another language was reported as the major choice by only one pairing, which was not selected in the process of stratified random sampling described in section 3.3.2. Interestingly, it was pointed out to me during my research that these two students were cousins, which possibly explains the special sociolinguistic dynamic between them.

On a final note, which applies to the whole argument advanced up to this point, I would like to argue that social factors and linguistic competence are inextricably linked in a positive feedback cycle. As speakers of other languages perceive (consciously or subconsciously) a pressure to adapt to a German linguistic norm, especially children and teenagers will soon acquire high levels of competence in this language. This means that more and more, the linguistic competence principle will likewise favor the use of the German language in many conversational constellations. Conversely, students with a German language background will have less of an opportunity to practice informal, conversational English because of these processes, which further reinforces the cycle. At this point, it might be appropriate to discuss the group of third language speakers, who seemingly resist the general trend towards German identified for so many other speakers. Based on a closer study of the individual biographies of the members of this small group, it can be said that, unlike the

[^44]respondents in the bilingual and multilingual groups just covered, the respondents in group (o) are generally recent arrivals to Austria. In all likelihood, they had had little exposure to German before that, so it is not surprising that they pattern with English-speaking students in the analysis, presumably because of a lack of language competence in German. In this regard, it is telling that in the social network diagram I was able to draw for one of the classes (APPENDIX C), of the two isolated nodes that exist, one is a member of home language background (o). ${ }^{70}$ Incidentally, students in this home language category usually fell into the (o) educational category as well, explaining the very similar anomaly we find with regard to that factor.

This naturally brings us to the third variable that was identified as significant in the main analysis, viz. the previous educational background of the respondents. The order of the factor levels is in alignment with their hypothesized effects, with previous education mostly in English or a third language favoring the application value (i.e. the use of English in informal conversations), a previous educational background within Vienna Bilingual Schooling slightly favoring it, and previous education in German disfavoring it. ${ }^{71}$ I would like to stress that, as the result of multivariate analysis, these numbers represent the effects of previous educational backgrounds with any effects of home language backgrounds filtered out. In other words, the fact that respondents with home language backgrounds other than German will also more frequently have a nonGerman educational background cannot be assumed to be the cause of the effect observed in the multivariate analysis. That one can exclude the possibility that the effect in one variable is merely a covariate effect of other factors is precisely the special quality of a multivariate approach.

[^45]The constraint ranking of the various educational backgrounds is straightforward to explain. For the majority German-speaking student population, VBS is a partial immersion program. For the much smaller number of students who have a (partially) English home language background, it could be considered a language maintenance program if contrasted with a standard, all-German public education. In both cases, it is not surprising that the use of English is slightly higher among those who attended VBS previously, compared to those who received their previous education in German. At the same time, adoption of English for the one group, and maintenance for the other, must be expected to be lower than for those students who attended exclusively or mostly Englishlanguage schools. ${ }^{72}$

As far as analysis B on mixed codes is concerned, it is interesting to note how closely tied up the practice of code switching is with the use of English. The effect can be observed in the factor weights, as well as in the raw percentages of the initial distributional analysis. To a certain degree, this is a knock-on effect that stems from the overall dominance of German. However, I would like to argue that a general ambivalence towards code switching is another result of the norm of territorial bilingualism. The very idea that language choice should be governed by external factors is central to this norm, and this naturally discourages code mixing. Overall, the response rate to (and informativeness of) the section on code switching on the questionnaire was not particularly good. However, ambivalence towards code switching best describes the tenor of the replies I received, with respondents who grew up in outer circle countries often expressing the most positive attitudes. This is not surprising, given that these respondents are probably less influenced by the societal norm of territorial bilingualism.

72 I am aware that we must expect further variation between students who received instruction in English in Austria (International School, American School), an English-speaking country, or a third country, all of which are educational backgrounds represented in the sample. However, the general trend will be the same for all groups.

A very interesting finding of the second analysis was that the gender constellation seemed to affect the amount of code switching between conversational partners. We must note that the effect is not particularly pronounced, but the fact that intra-gender interaction slightly favors the practice of code switching could be by virtue of a reduced social distance in these pairings. It would have been interesting to elicit whether this pattern registered consciously with respondents, but as I had not necessarily expected to find this particular effect, I did not pose any questions related to it in my interviews.

Finally, I would like to draw on some evidence from the social network analysis that I conducted in one of the classes. The argument will focus on two students (the nodes in the network marked S1 and S2, APPENDIX C) who are rather similar in terms of their nominal group memberships: both are female, raised GermanEnglish bilinguals, who grew up in Austria, but only started attending bilingual schooling at the upper secondary level. The students do clearly differ, however, in two important respects. First, they responded differently to the more attitudinal sociolinguistic metrics of my study. Student 1 reported a balanced consumption of English-language and German-language media, did not take exception at movies being dubbed on Austrian television, and projected that German would be the predominant language in her private life, whereas both English and German would be important in her professional life. Student 2, on the other hand, always indicated a clear preference for English in the media section (each time using an exclamation point to mark how strongly she felt about these issues). Similarly, she projected that English would predominate in both her future private and professional lives. Not surprisingly, the two students are embedded in corresponding structures in the network. Whereas student 1 is part of a mixed, but predominantly German-speaking cluster in the network, student 2 participates in a cluster that includes many speakers with a partly English home language background. This correspondence between network
attributes and social psychological items in the questionnaire is certainly a noteworthy finding that exemplifies the qualities of network analysis.

If we connect this information to the answers these two students gave in the main survey, on the other hand, there is little to choose between them. That is to say, their linguistic choices - broken down interlocutor by interlocutor - are very congruent. Does this say that network ties and attitudinal factors play little role in code selection, and that overarching social norms trump individualistic assertions of identity? In my view, the issue is more complex than that. We should not forget that the itemized analysis of conversational pairings as conducted in this study does not necessarily reflect frequencies of usage for every individual speaker. In other words, it is not unreasonable to assume that student 2 overall uses considerably more English than student 1, because a majority of conversations will be conducted within the respective peer group clusters they participate in. At the same time, I feel it is important to appreciate that at the level of the interlocutor, linguistic choices (in terms of unmarked codes) seem to be fairly predetermined by wider social rules. These complex findings, in my view, very much correspond with the heterogeneous models of linguistic identity discussed in section 2.3 . On the one hand, speakers do have individual agency that allows them to, amongst other things, select the peer groups they want to participate in, or the kinds of media they consume. At the same time, speakers are constrained by wider sociolinguistic norms, which in the case of Vienna Bilingual Schooling consist of fairly strict rules as to which language is appropriate for each conversational pairing (given their respective linguistic backgrounds). I believe this argument about the complexity of the interplay between network ties, attitudinal factors, issues of identity, and wider sociolinguistic norms in the processes of code selection is a fitting conclusion to this discussion.

## 4 CONTEXTUALIZING THE RESULTS

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English in the expanding circle
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In the preceding section, the quantitative and qualitative data were interpreted mostly with a view to their immediate context at Vienna Bilingual Schooling. In the rationale advanced at the very beginning of this text, however, it was mentioned that part of the motivation behind this study was the possible applicability of its results to a complex of wider-ranging issues, such as the role of English in Austria, and by extension its status in expanding circle countries.

Much has been written about the likely further spread of English in the expanding circle (e.g. Crystal 2003: 27, Berns 2005: 85), and in a way, Vienna Bilingual Schooling is itself representative of this trend. After all, the use of the English language in Austrian education outside of specified language classes is a relatively novel phenomenon. Is it possible, however, to draw conclusions from this specific setting about more general trends in the expanding circle? I would like to answer this question by rebutting an alternative view, formulated by Bruthiaux (2003), who questions the very utility of the three circles model in discussing current trends in international English. He argues that the model can no longer deal adequately with global English in the $21^{\text {st }}$ century, and has "outlived its usefulness" (Bruthiaux 2003: 161). Instead,
a $21^{\text {st }}$ century alternative [is needed] that focuses [...] on the specific sociolinguistic characteristics of English-speaking communities wherever they are found. (Bruthiaux 2003: 161)

Increasing sociolinguistic fragmentation among populations is seen as a major effect of global English in this view, rendering any summary treatment by country infeasible. For instance, Bruthiaux (2003: 169) suggests that, both in the outer and expanding circles, command and use of English vary as much by
educational level and social status as by location. Widely varying estimates of proficiency levels in these countries are put forward as an indicator of incoherence within the model in this regard.

It would be a fair assumption that Vienna Bilingual Schooling is a candidate for such linguistic exceptionalism, rendering it unrepresentative of developments within the wider social context. Based on the evidence of my study, however, I would argue that a strong uniting factor of expanding-circle localities might lie in the persistence of certain sociolinguistic norms rather than in the strict homogeneousness of the population. The linguistic community at Vienna Bilingual Schooling is bilingual in its working languages, and multilingual in its home language backgrounds, yet it clearly follows expanding-circle conventions in its linguistic choices in informal conversations. This speaks against the notion of increasing fragmentation within the expanding circle, at least as far as some essential sociolinguistc norms are concerned. Another issue is whether the increasing use of English in certain higher domains (and concurrent high levels of proficiency) are restricted to specific sub-sections within society. Here, Bruthiaux's (2003: 161) claims as to fragmentation within the expanding circle might be more applicable to Vienna Bilingual Schooling. However, given the increasing use of English in both higher and secondary education in Austria (e.g. CLIL, cf. Dalton-Puffer 2007: 45), VBS might be less exceptional than it initially appears.

This embeddedness of Vienna Bilingual Schooling within wider Austrian society arguably differentiates the setting of this study from other linguistic communities in Vienna, for instance some private English-language schools. These exhibit much greater social and institutional insulation from mainstream Austrian society, ${ }^{73}$ and are consequently apt to be more endonormative

[^46]linguistically. The final point is just to lend some credence to Bruthiaux's (2003: 161) claim that the status of the English language can also vary at the community level. However, this is ultimately just a re-statement of the argument favoring fine-grained sociolinguistic analyses over the blind reliance on speech communities designated by political boundaries (cf. section 2.2.1). It does not, in my view, subtract from the usefulness of the generalizations inherent in the three circles model.

Following the foregoing argument, this study can be said to shine a light on the social dynamics that come into play as the English language is gradually adopted in certain domains within the expanding circle. Based on the evidence of section 3, it seems unlikely that in the informal sphere English will make rapid inroads in these societies, even as it becomes more widely used in specific settings such as (higher) education or international business. Deducing from both the quantitative and the qualitative data of my study, I would like to argue that the forces responsible for this are both demographic and social psychological (i.e. the result of linguistic attitudes). While Vienna Bilingual Schooling aims to attract a very diverse student population, in particular students with English home language backgrounds, the demographic realities of an expanding-circle locality ensure that there is a strong, homogeneous core of speakers of the local national language, in this case German. As examples over the last fifty years from the outer circle show, the local language generally remains the preferred medium of informal interaction because it is a source of identity for its speakers (Crystal 2003: 22). ${ }^{74}$ Overall, language maintenance must be expected to be even more sustained in the expanding circle, where English encounters contact languages that are much stronger and more homogeneously established in their communities, enjoying not only high solidarity ratings, but generally also high prestige in their standard forms. These positive attitudes towards local national

[^47]languages are further codified in the sociolinguistic norm of territorial bilingualism, which requires that linguistic resources are allocated by geographic location rather than domain or function.

It is true that international English, by its very nature, will go a certain way to deconstruct the monolingual myth in expanding-circle societies, but it is improbable that associated linguistic norms will be wholly abandoned. Rather, a pattern is likely to emerge in which English is adopted in addition to national languages in certain well-circumscribed domains, especially those in which cross-border interaction is both essential and frequent (e.g. in international business, research and education, or the new media). At the same time, however, the dominant status of the national language as the main vernacular language is unlikely to be challenged in expanding circle localities. This is because even members of communities or social networks who rely quite heavily on the English language in some areas of their lives, such as the population of Vienna Bilingual Schooling, seem to follow this norm. This principle even extends to long-term residents who are not native speakers of the national language.

In consequence, rather than viewing the expanding circle as a motley collection of localities which do not belong to either the inner or the outer circle, it could be characterized as consisting of countries where a national language other than English ${ }^{75}$ is historically well-established, and where territorial bilingualism is a central sociolinguistic norm. This description certainly fits most countries in continental Europe, where some further commonalities exist that support the idea of at least partly parallel developments. One such shared quality is the relative homogeneousness and egalitarian structure of the society as far as access to educational opportunities is concerned. As a result, linguistic resources are apt to be equally homogeneously allocated. For instance, Dalton-Puffer (2007: 45ff) reviews how both in Austria and across Europe English is gaining traction as a
medium of instruction. This general access to educational opportunities differentiates European expanding-circle countries from many outer-circle countries. Certainly, conditions will at times vary even between relatively similar societies. While the political status of national languages is similar in most European countries, differences in the size of linguistic communities might lead to status disparities at an economic level. Therefore, it is conceivable that German is more vigorous in the face of global English than other, smaller national languages might be. Nevertheless, these differences are unlikely to truly affect the importance of the national languages as the main vernacular languages in most expanding-circle countries.

One final question would be how increased mobility among the population is likely to affect linguistic developments in the expanding circle, particularly in Europe, where many other barriers to cross-border mobility have been removed. First, the very diverse student population found at Vienna Bilingual Schooling suggests that such mobility is already a fact, but that it seems to have only a limited impact on the adoption of English as a vernacular language. Ultimately, it must also be noted that linguistic norms such as territorial bilingualism and limited long-term mobility are inextricably linked in a positive feedback cycle, providing a further reifying factor for the sociolinguistic realities in the expanding circle.

Overall, it can be argued that the global spread of English does, and will continue to have, an impact on the countries of the expanding circle. At the same time, important historical and cultural differences exist that differentiate these contexts from those in both the inner and outer circles. Consequently, the sociolinguistic development of expanding-circle localities is likely to be idiosyncratic and, as always in sociolinguistics, not completely predictable.

## 5 CONCLUSION

'looking back and ahead...

What, then, are the main findings of this study on bilingualism, code choice, and identity at Vienna Bilingual Schooling? To answer this question, I would like to recapitulate the primary research questions that were posed, and to assess how well the methodology employed in this study was able to answer them.

The central concern of my research was to establish patterns of code choice in informal conversations among students at the upper-secondary level of Vienna Bilingual Schooling. The research question was formulated in a way that viewed the sociolinguistic backgrounds of the interlocutors as the central elements in the model. Questionnaires were used to gather the raw data, which appeared to be an appropriate and reliable methodology in this particular setting. More ethnographic approaches were relied on to corroborate the main findings and to provide qualitative data for their interpretation. Relatively detailed linguistic biographies were extracted from the questionnaires, including such variables as home language background and educational history, amongst others. Multivariate analysis was used in an attempt to establish which of these sociolinguistic factors can be demonstrated to have a bearing on code selection when all the variables are modeled concurrently.

In the resulting multivariate model, the home language backgrounds of the conversational partners are by far the factors most predictive of code choice at the upper-secondary level of Vienna Bilingual Schooling. Owing to the numerical dominance of German-language backgrounds, this language is much more frequent in informal conversations. With the help of some of the qualitative data, it was demonstrated that the dominance of German is not only
the result of numerical and psycholinguistic factors (language competence), but also of contextual social factors (including issues of identity). Vienna Bilingual Schooling, it was argued, must be viewed as embedded in a wider social context, and thus informal conversations are influenced by some external sociolinguistic norms. An argument was ultimately advanced which saw the sociolinguistic dynamics at Vienna Bilingual Schooling as evocative of the larger context of English in the expanding circle. In these localities, the use of English is likely to continue to increase within certain domains such as education, but the status of the national language as the predominant linguistic choice in informal contexts remains relatively unchallenged, it was argued. The pervasive sociolinguistic norm of territorial bilingualism was postulated to be a deciding element in this equation.

Returning to the immediate results of the multivariate analysis, several genuine secondary effects could be identified that affected linguistic choices. Thus, the educational biographies of students could be demonstrated to have a bearing on code selection, and the gender constellation appeared to play a role in the selection of mixed codes. The significance of factors beyond those just mentioned could not be established conclusively, but further investigation of several of these appears promising. Especially, more thorough and fine-grained metrics of both language attitudes and linguistic competence could yield rewarding variables in a multivariate analysis of code choice. Ultimately, however, it will always prove difficult to disentangle the effects of such factors as linguistic attitudes, language competence, and social norms, no matter how astute the methodology. After all, their fundamental interdependence might be their most essential characteristic from a sociolinguistic perspective.

Overall, this study was able to confirm the sociolinguistic portraits of Vienna Bilingual Schooling provided by Hüttner (1997) and Gräll (1999), while additionally attempting to relate the sociolinguistic realities within this specific
community to its wider social context. It is hoped that this study was able to demonstrate how the detailed description of small-scale communities and social networks informs the discourse on more general sociolinguistic phenomena, and vice versa.

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## APPENDIX A - SAMPLE QUESTIONNAIRE

## universität wien

Good morning,
Please fill in this questionnaire to the best of your knowledge. This is not an exam. There are no right or wrong answers in this questionnaire. Just be honest, that's all.
All the answers you give will be treated with absolute confidentiality. Your teachers, fellow pupils or parents will not get to see your filled-in questionnaire.

Your first name: $\qquad$
What is/are your first/native language(s)?
Which language(s) do you regularly use at home? (please be as specific as possible)

Are you? female $\square$ male $\square$
Schools you attended before coming to ((SCHOOL NAME)): (e.g. age: school, country, language)


PART A
FOR ALL OF THE QUESTIONS IN PART A, IMAGINE THE FOLLOWING SITUATION: during break at school, you talk to one of your classmates about an everyday subject (about what you are going to do over the weekend, for example). In each box, write down the first name of a classmate, then indicate which language (or combination of languages) you would normally use when talking to them. If you use the same language with several of your classmates then you can also write more than one name into the 'names' field. Codes used: $\mathbf{E}=$ English; $\mathbf{G}=$ German; $\mathbf{5 0} \% \mathbf{- 5 0 \%}=$ about equal amounts of English and German. If you regularly use a language other than English or German with one of your classmates please write it in the 'comments' field. Please try to include all your classmates in your questionnaire.

Name(s) of classmate(s):

| mostly E | E with some G | 50\%-50\% | G with some E | mostly G |
| :---: | :---: | :---: | :---: | :---: |
| Comments: |  |  |  |  |
| Name(s) of classmate(s): |  |  |  |  |
| Language: |  |  |  |  |
| mostly E | E with some G | 50\%-50\% | G with some E | mostly G |
| Comments: |  |  |  |  |
| Name(s) of classmate(s): |  |  |  |  |
| Language: |  |  |  |  |
| mostly E | E with some G | 50\%-50\% | G with some E | mostly G |
| Comments: |  |  |  |  |
| Name(s) of classmate(s): |  |  |  |  |
| Language: |  |  |  |  |
| mostly E | E with some G | 50\%-50\% | G with some E | mostly G |


| mostly E | E with some G | 50\%-50\% | G with some E | mostly G |
| :---: | :---: | :---: | :---: | :---: |
| Comments: |  |  |  |  |
| Name(s) of classmate(s): |  |  |  |  |
| Language: |  |  |  |  |
| mostly E | E with some G | 50\%-50\% | G with some E | mostly G |
| Comments: |  |  |  |  |
| Name(s) of classmate(s): |  |  |  |  |
| Language: |  |  |  |  |
| mostly E | E with some G | 50\%-50\% | G with some E | mostly G |
| Comments: |  |  |  |  |
| Name(s) of classmate(s): |  |  |  |  |
| Language: |  |  |  |  |
| mostly E | E with some G | 50\%-50\% | G with some E | mostly G |
| Comments: |  |  |  |  |
| Name(s) of classmate(s): |  |  |  |  |
| Language: |  |  |  |  |
| mostly E | E with some G | 50\%-50\% | G with some E | mostly G |
| Comments: |  |  |  |  |
| Name(s) of classmate(s): |  |  |  |  |
| Language: |  |  |  |  |
| mostly E | E with some G | 50\%-50\% | G with some E | mostly G |
| Comments: |  |  |  |  |
| Name(s) of classmate(s): |  |  |  |  |
| Language: |  |  |  |  |
| mostly E | E with some G | 50\%-50\% | G with some E | mostly G |
| Comments: |  |  |  |  |
| Name(s) of classmate(s): |  |  |  |  |
| Language: |  |  |  |  |
| mostly E | E with some G | 50\%-50\% | G with some E | mostly G |
| Comments: |  |  |  |  |
| Name(s) of classmate(s): |  |  |  |  |
| Language: |  |  |  |  |
| mostly E | E with some G | 50\%-50\% | G with some E | mostly G |
| Comments: |  |  |  |  |



When you want a favour from one of your classmates, does this affect your choice of language? (how?)
$\square$

How do you feel about two people whose native language is German talking English to each other?


How do you feel about two people whose native language is English talking German to each other?


Do you often mix English / German in conversations with your classmates?

$$
\text { yes } \square \quad \text { no } \square \quad \text { sometimes } \square \quad \text { don't know } \square
$$

Do you sometimes start a sentence in one language and finish it in another?

$$
\text { yes } \square \quad \text { no } \square \quad \text { sometimes } \square \quad \text { don't know } \square
$$

How do you feel about other people switching languages during a conversation?


Which language, do you think, is going to play a bigger role in your life?
Private life:-
professional life:

How do you feel about your own language skills? (no need to answer this for your native language)
English: happy with my skills $\square$ OK/satisfactory $\square \quad$ wish they were (much) better $\square$ German: happy with my skills $\square$ OK/satisfactory $\square$ wish they were (much) better $\square$

Having attended a bilingual school will probably give you an advantage in your future professional life. But how do you think the experience has affected your personality?


Thank you sooo much for your help!!!

I'd be willing to talk about my experiences at ((VBS)) in a follow-up interview... (ticking 'yes' here is not binding; you can always change your mind lateri)

## APPENDIX B - MULTIVARIATE ANALYSES

ANALYSIS A, ENGLISH VS. GERMAN

```
- CELL CREATION • 22.10.2008 23:24:28
...................................................
    Name of token file: working copy revised all discr filtered
plus4ABBIK.tkn
Name of condition file: recode Oct09 excll mark7.cnd
(
(12 (NIL (COL 12 x))
    (G (COL 12 g))
    (G (COL 12 G))
    (E (COL 12 5))
    (E (COL 12 E))
    (E (COL 12 e))
    (x (COL 12 x)))
(3)
(4)
(5)
(6 (G (COL 6 g))
    (E (COL 6 e))
    (B (COL 6 b))
    (/ (COL 6 x)))
(7 (0 (COL 7 0))
    (0 (COL 7 1))
    (1 (COL 7 2))
    (1 (COL 7 3))
    (2 (COL 7 4))
    (2 (COL 7 5))
    (2 (COL 7 6)))
    Number of cells: 346
    Application value(s): E
    Total no. of factors: 25
\begin{tabular}{|c|c|c|c|c|c|}
\hline Group & & Apps & Nonapps & Total & \% \\
\hline \multicolumn{6}{|l|}{1 (3)} \\
\hline \multirow[t]{2}{*}{M} & N & 17 & 111 & 128 & 10.1 \\
\hline & \% & 13.3 & 86.7 & & \\
\hline \multirow[t]{2}{*}{m} & N & 40 & 201 & 241 & 19.0 \\
\hline & \% & 16.6 & 83.4 & & \\
\hline \multirow[t]{2}{*}{f} & N & 42 & 218 & 260 & 20.5 \\
\hline & \% & 16.2 & 83.8 & & \\
\hline \multirow[t]{2}{*}{F} & N & 125 & 513 & 638 & 50.4 \\
\hline & \% & 19.6 & 80.4 & & \\
\hline \multirow[t]{2}{*}{Total} & N & 224 & 1043 & 1267 & \\
\hline & \% & 17.7 & 82.3 & & \\
\hline
\end{tabular}
    2 (4)
    O N N 21 %
```

|  | \% | 21.6 | 78.4 |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 9 | N | 23 | 206 | 229 | 18.1 |
|  | \% | 10.0 | 90.0 |  |  |
| e | N | 70 | 47 | 117 | 9.2 |
|  | \% | 59.8 | 40.2 |  |  |
| B | N | 14 | 58 | 72 | 5.7 |
|  | \% | 19.4 | 80.6 |  |  |
| E | N | 20 | 1 | 21 | 1.7 |
|  | \% | 95.2 | 4.8 |  |  |
| G | N | 51 | 623 | 674 | 53.2 |
|  | \% | 7.6 | 92.4 |  |  |
| - | N | 25 | 32 | 57 | 4.5 |
|  | \% | 43.9 | 56.1 |  |  |
| Total | N | 224 | 1043 | 1267 |  |
|  | \% | 17.7 | 82.3 |  |  |
| 3 (5) |  |  |  |  |  |
| 0 | N | 21 | 78 | 99 | 7.8 |
|  | \% | 21.2 | 78.8 |  |  |
| g | N | 21 | 205 | 226 | 17.8 |
|  | \% | 9.3 | 90.7 |  |  |
| e | N | 83 | 38 | 121 | 9.6 |
|  | \% | 68.6 | 31.4 |  |  |
| B | N | 11 | 65 | 76 | 6.0 |
|  | \% | 14.5 | 85.5 |  |  |
| E | N | 25 | 2 | 27 | 2.1 |
|  | \% | 92.6 | 7.4 |  |  |
| G | N | 33 | 630 | 663 | 52.3 |
|  | \% | 5.0 | 95.0 |  |  |
| - | N | 30 | 25 | 55 | 4.3 |
|  | \% | 54.5 | 45.5 |  |  |
| Total | N | 224 | 1043 | 1267 |  |
|  | \% | 17.7 | 82.3 |  |  |
| 4 (6) |  |  |  |  |  |
| B | N | 107 | 378 | 485 | 40.5 |
|  | \% | 22.1 | 77.9 |  |  |
| E | N | 53 | 47 | 100 | 8.4 |
|  | \% | 53.0 | 47.0 |  |  |
| G | N | 34 | 566 | 600 | 50.1 |
|  | \% | 5.7 | 94.3 |  |  |
| $\bigcirc$ | N | 9 | 3 | 12 | 1.0 |



```
Group # 3 -- O: 0.670, g: 0.436, e: 0.943, B: 0.561, E: 0.990, G:
0.284, o: 0.901
Log likelihood = -403.968 Significance = 0.000
Run # 5, 5 cells:
Convergence at Iteration 5
Input 0.130
Group # 4 -- B: 0.654, E: 0.883, G: 0.287, O: 0.952
Log likelihood = -508.350 Significance = 0.000
Run # 6, 3 cells:
Convergence at Iteration 5
Input 0.164
Group # 5 -- 0: 0.337, 1: 0.459, 2: 0.686
Log likelihood = -563.840 Significance = 0.000
Add Group # 3 with factors OgeBEGo
---------- Level # 2 ------------
Run # 7, 25 cells:
Convergence at Iteration 8
Input 0.115
Group # 1 -- M: 0.455, m: 0.439, f: 0.598, F: 0.492
Group # 3 -- O: 0.648, g: 0.443, e: 0.948, B: 0.574, E: 0.991, G:
0.280, o: 0.895
Log likelihood = -401.338 Significance = 0.162
Run # 8, 48 cells:
Convergence at Iteration 16
Input 0.045
Group # 2 -- O: 0.605, g: 0.390, e: 0.973, B: 0.717, E: 0.998, G:
0.251, o: 0.958
Group # 3 -- O: 0.603, g: 0.376, e: 0.983, B: 0.698, E: 0.998, G:
0.220, o: 0.974
Log likelihood = -252.231 Significance = 0.000
Run # 9, 35 cells:
Convergence at Iteration 8
Input 0.073
Group # 3 -- O: 0.649, g: 0.420, e: 0.958, B: 0.556, E: 0.993, G:
0.270, 0: 0.929
Group # 4 -- B: 0.666, E: 0.932, G: 0.256, o: 0.974
Log likelihood = -326.996 Significance = 0.000
Run # 10, 21 cells:
Convergence at Iteration 7
Input 0.101
Group # 3 -- O: 0.650, g: 0.417, e: 0.949, B: 0.570, E: 0.992, G:
0.280, o: 0.916
Group # 5 -- 0: 0.289, 1: 0.447, 2: 0.737
Log likelihood = -375.403 Significance = 0.000
Add Group # 2 with factors OgeBEGo
    Level # 3
Run # 11, 112 cells:
Convergence at Iteration 17
```

```
Input 0.045
Group # 1 -- M: 0.487, m: 0.516, f: 0.612, F: 0.451
Group # 2 -- O: 0.599, g: 0.388, e: 0.973, B: 0.722, E: 0.998, G:
0.250, o: 0.959
Group # 3 -- O: 0.563, g: 0.380, e: 0.985, B: 0.714, E: 0.998, G:
0.218, o: 0.971
Log likelihood = -250.262 Significance = 0.272
Run # 12, 122 cells:
Convergence at Iteration 16
Input 0.039
Group # 2 -- O: 0.518, g: 0.470, e: 0.954, B: 0.676, E: 0.996, G:
0.271, o: 0.948
Group # 3 -- O: 0.588, g: 0.394, e: 0.983, B: 0.695, E: 0.998, G:
0.215, 0: 0.975
Group # 4 -- B: 0.617, E: 0.772, G: 0.350, o: 0.822
Log likelihood = -241.796 Significance = 0.000
Run # 13, 107 cells:
Convergence at Iteration 16
Input 0.043
Group # 2 -- O: 0.616, g: 0.427, e: 0.962, B: 0.685, E: 0.999, G:
0.254, 0: 0.957
Group # 3 -- O: 0.591, g: 0.378, e: 0.983, B: 0.706, E: 0.998, G:
0.217, ○: 0.974
Group # 5 -- 0: 0.427, 1: 0.462, 2: 0.619
Log likelihood = -249.252 Significance = 0.051
Add Group # 4 with factors BEGo
    Level # 4
Run # 14, 227 cells:
Convergence at Iteration 16
Input 0.039
Group # 1 -- M: 0.446, m: 0.510, f: 0.612, F: 0.461
Group # 2 -- O: 0.521, g: 0.466, e: 0.954, B: 0.679, E: 0.996, G:
0.270, o: 0.951
Group # 3 -- O: 0.553, g: 0.397, e: 0.985, B: 0.711, E: 0.998, G:
0.213, 0: 0.974
Group # 4 -- B: 0.618, E: 0.771, G: 0.349, O: 0.824
Log likelihood = -239.912 Significance = 0.289
Run # 15, 204 cells:
Convergence at Iteration 16
Input 0.039
Group # 2 -- O: 0.533, g: 0.490, e: 0.943, B: 0.658, E: 0.997, G:
0.274, 0: 0.941
Group # 3 -- O: 0.581, g: 0.391, e: 0.984, B: 0.697, E: 0.998, G:
0.214, o: 0.976
Group # 4 -- B: 0.610, E: 0.747, G: 0.360, O: 0.855
Group # 5 -- 0: 0.430, 1: 0.475, 2: 0.595
Log likelihood = -240.074 Significance = 0.184
No remaining groups significant
Groups selected while stepping up: 3 2 4
Best stepping up run: #12
```

```
Stepping down...
    Level # 5
Run # 16, 346 cells:
Convergence at Iteration 16
Input 0.038
Group # 1 -- M: 0.466, m: 0.522, f: 0.609, F: 0.454
Group # 2 -- O: 0.528, g: 0.487, e: 0.944, B: 0.661, E: 0.997, G:
0.273, 0: 0.944
Group # 3 -- O: 0.543, g: 0.396, e: 0.986, B: 0.714, E: 0.998, G:
0.212, 0: 0.974
Group # 4 -- B: 0.611, E: 0.745, G: 0.360, O: 0.851
Group # 5 -- 0: 0.428, 1: 0.475, 2: 0.596
Log likelihood = -238.197
    Level # 4
Run # 17, 204 cells:
Convergence at Iteration 16
Input 0.039
Group # 2 -- O: 0.533, g: 0.490, e: 0.943, B: 0.658, E: 0.997, G:
0.274, 0: 0.941
Group # 3 -- O: 0.581, g: 0.391, e: 0.984, B: 0.697, E: 0.998, G:
0.214, o: 0.976
Group # 4 -- B: 0.610, E: 0.747, G: 0.360, O: 0.855
Group # 5 -- 0: 0.430, 1: 0.475, 2: 0.595
Log likelihood = -240.074 Significance = 0.291
Run # 18, 188 cells:
Convergence at Iteration 11
Input 0.066
Group # 1 -- M: 0.443, m: 0.478, f: 0.587, F: 0.484
Group # 3 -- O: 0.605, g: 0.412, e: 0.965, B: 0.573, E: 0.995, G:
0.265, o: 0.933
Group # 4 -- B: 0.673, E: 0.904, G: 0.262, O: 0.981
Group # 5 -- 0: 0.295, 1: 0.486, 2: 0.676
Log likelihood = -312.037 Significance = 0.000
Run # 19, 123 cells:
No Convergence at Iteration 20
Input 0.123
Group # 1 -- M: 0.430, m: 0.554, f: 0.449, F: 0.514
Group # 2 -- O: 0.555, g: 0.472, e: 0.831, B: 0.542, E: 0.985, G:
0.374, o: 0.756
Group # 4 -- B: 0.610, E: 0.706, G: 0.367, o: 0.874
Group # 5 -- 0: 0.433, 1: 0.493, 2: 0.561
Log likelihood = -443.224 Significance = 0.000
Run # 20, 217 cells:
Convergence at Iteration 17
Input 0.043
Group # 1 -- M: 0.511, m: 0.529, f: 0.610, F: 0.442
Group # 2 -- O: 0.601, g: 0.427, e: 0.964, B: 0.690, E: 0.999, G:
0.253, o: 0.957
Group # 3 -- O: 0.548, g: 0.384, e: 0.986, B: 0.723, E: 0.998, G:
0.214, o: 0.971
Group # 5 -- 0: 0.423, 1: 0.461, 2: 0.623
```

```
Log likelihood = -247.094 Significance = 0.000
Run # 21, 227 cells:
Convergence at Iteration 16
Input 0.039
Group # 1 -- M: 0.446, m: 0.510, f: 0.612, F: 0.461
Group # 2 -- O: 0.521, g: 0.466, e: 0.954, B: 0.679, E: 0.996, G:
0.270, o: 0.951
Group # 3 -- O: 0.553, g: 0.397, e: 0.985, B: 0.711, E: 0.998, G:
0.213, o: 0.974
Group # 4 -- B: 0.618, E: 0.771, G: 0.349, O: 0.824
Log likelihood = -239.912 Significance = 0.185
Cut Group # 1 with factors MmfF
---------- Level # 3 ----------
Run # 22, 80 cells:
Convergence at Iteration 10
Input 0.067
Group # 3 -- O: 0.631, g: 0.405, e: 0.963, B: 0.558, E: 0.995, G:
0.267, o: 0.936
Group # 4 -- B: 0.670, E: 0.907, G: 0.263, O: 0.978
Group # 5 -- 0: 0.291, 1: 0.486, 2: 0.680
Log likelihood = -313.512 Significance = 0.000
Run # 23, 47 cells:
No Convergence at Iteration 20
Input 0.124
Group # 2 -- 0: 0.565, g: 0.465, e: 0.830, B: 0.544, E: 0.984, G:
0.375, o: 0.755
Group # 4 -- B: 0.609, E: 0.703, G: 0.368, o: 0.878
Group # 5 -- 0: 0.439, 1: 0.491, 2: 0.560
Log likelihood = -444.940 Significance = 0.000
Run # 24, 107 cells:
Convergence at Iteration 16
Input 0.043
Group # 2 -- O: 0.616, g: 0.427, e: 0.962, B: 0.685, E: 0.999, G:
0.254, o: 0.957
Group # 3 -- 0: 0.591, g: 0.378, e: 0.983, B: 0.706, E: 0.998, G:
0.217, o: 0.974
Group # 5 -- 0: 0.427, 1: 0.462, 2: 0.619
Log likelihood = -249.252 Significance = 0.000
Run # 25, 122 cells:
Convergence at Iteration 16
Input 0.039
Group # 2 -- O: 0.518, g: 0.470, e: 0.954, B: 0.676, E: 0.996, G:
0.271, o: 0.948
Group # 3 -- O: 0.588, g: 0.394, e: 0.983, B: 0.695, E: 0.998, G:
0.215, o: 0.975
Group # 4 -- B: 0.617, E: 0.772, G: 0.350, O: 0.822
Log likelihood = -241.796 Significance = 0.184
Cut Group # 5 with factors 012
```

Run \# 26, 35 cells:
Convergence at Iteration 8
Input 0.073
Group \# 3 -- O: 0.649, g: 0.420, e: 0.958, B: 0.556, E: 0.993, G:
0.270, o: 0.929
Group \# 4 -- B: 0.666, E: 0.932, G: 0.256, o: 0.974
Log likelihood = -326.996 Significance = 0.000
Run \# 27, 25 cells:
No Convergence at Iteration 20
Input 0.124
Group \# 2 -- O: 0.560, g: 0.457, e: 0.852, B: 0.558, E: 0.983, G:
0.370, o: 0.772
Group \# 4 -- B: 0.609, E: 0.721, G: 0.365, O: 0.863
Log likelihood = -446.638 Significance = 0.000
Run \# 28, 48 cells:
Convergence at Iteration 16
Input 0.045
Group \# 2 -- O: 0.605, g: 0.390, e: 0.973, B: 0.717, E: 0.998, G:
0.251, o: 0.958
Group \# 3 -- O: 0.603, g: 0.376, e: 0.983, B: 0.698, E: 0.998, G:
0.220, ○: 0.974
Log likelihood = -252.231 Significance = 0.000
All remaining groups significant
Groups eliminated while stepping down: 1 5
Best stepping up run: \#12
Best stepping down run: \#25

```

\section*{ANALYSIS B, MIXED CODES}
```

- CELL CREATION • 2008/10/24 11:13:32 AM
............................................
Name of token file: working copy revised all discr filtered
plus4ABBIK.tkn
Name of condition file: recode Oct09 excll mark7 mixed codes.cnd
(
(12 (NIL (COL 12 x))
(B (COL 12 g))
(M (COL 12 G))
(B (COL 12 5))
(M (COL 12 E))
(B (COL 12 e))
(x (COL 12 x)))
(3)
(4)
(5)
(6 (G (COL 6 g))
(E (COL 6 e))
(B (COL 6 b))
(/ (COL 6 x)))
(7 (0 (COL 7 0))
(0 (COL 7 1))
(1 (COL 7 2))
(1 (COL 7 3))
(2 (COL 7 4))
(2 (COL 7 5))
(2 (COL 7 6)))
Number of cells: 347
Application value(s): B
Total no. of factors: 25

| Group |  | Apps | Nonapps | Total |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 1 (3) |  |  |  |  |  |
| M | N | 35 | 95 | 130 | 10.2 |
|  | \% | 26.9 | 73.1 |  |  |
| m | N | 38 | 203 | 241 | 19.0 |
|  | \% | 15.8 | 84.2 |  |  |
| f | N | 39 | 221 | 260 | 20.5 |
|  | \% | 15.0 | 85.0 |  |  |
| F | N | 149 | 489 | 638 | 50.3 |
|  | \% | 23.4 | 76.6 |  |  |
| Total |  | 261 | 1008 | 1269 |  |
|  | \% | 20.6 | 79.4 |  |  |

    2 (4
    O N N 20 77 l
    g N 39 191 230 18.1
    ```
\begin{tabular}{|c|c|c|c|c|c|}
\hline e & \[
\begin{aligned}
& \mathrm{N} \\
& \%
\end{aligned}
\] & \[
\begin{array}{r}
51 \\
43.6
\end{array}
\] & \[
\begin{array}{r}
66 \\
56.4
\end{array}
\] & 117 & 9.2 \\
\hline \multirow[t]{2}{*}{B} & N & 19 & 53 & 72 & 5.7 \\
\hline & \% & 26.4 & 73.6 & & \\
\hline \multirow[t]{2}{*}{E} & N & 7 & 14 & 21 & 1.7 \\
\hline & \% & 33.3 & 66.7 & & \\
\hline \multirow[t]{2}{*}{G} & N & 106 & 569 & 675 & 53.2 \\
\hline & \% & 15.7 & 84.3 & & \\
\hline \multirow[t]{2}{*}{\(\bigcirc\)} & N & 19 & 38 & 57 & 4.5 \\
\hline & \% & 33.3 & 66.7 & & \\
\hline \multirow[t]{2}{*}{Total} & N & 261 & 1008 & 1269 & \\
\hline & \% & 20.6 & 79.4 & & \\
\hline \multicolumn{6}{|l|}{3 (5)} \\
\hline \multirow[t]{2}{*}{0} & N & 36 & 63 & 99 & 7.8 \\
\hline & \% & 36.4 & 63.6 & & \\
\hline \multirow[t]{2}{*}{9} & N & 42 & 185 & 227 & 17.9 \\
\hline & \% & 18.5 & 81.5 & & \\
\hline \multirow[t]{2}{*}{e} & N & 56 & 65 & 121 & 9.5 \\
\hline & \% & 46.3 & 53.7 & & \\
\hline \multirow[t]{2}{*}{B} & N & 21 & 55 & 76 & 6.0 \\
\hline & \% & 27.6 & 72.4 & & \\
\hline \multirow[t]{2}{*}{E} & N & 10 & 17 & 27 & 2.1 \\
\hline & \% & 37.0 & 63.0 & & \\
\hline \multirow[t]{2}{*}{G} & N & 79 & 585 & 664 & 52.3 \\
\hline & \% & 11.9 & 88.1 & & \\
\hline \multirow[t]{2}{*}{-} & N & 17 & 38 & 55 & 4.3 \\
\hline & \% & 30.9 & 69.1 & & \\
\hline \multirow[t]{2}{*}{Total} & & 261 & 1008 & 1269 & \\
\hline & \% & 20.6 & 79.4 & & \\
\hline \multicolumn{6}{|l|}{4 (6)} \\
\hline \multirow[t]{2}{*}{B} & N & 116 & 369 & 485 & 40.5 \\
\hline & \% & 23.9 & 76.1 & & \\
\hline \multirow[t]{2}{*}{E} & N & 37 & 64 & 101 & 8.4 \\
\hline & \% & 36.6 & 63.4 & & \\
\hline \multirow[t]{2}{*}{G} & N & 81 & 520 & 601 & 50.1 \\
\hline & \% & 13.5 & 86.5 & & \\
\hline \multirow[t]{2}{*}{\(\bigcirc\)} & N & 7 & 5 & 12 & 1.0 \\
\hline & \% & 58.3 & 41.7 & & \\
\hline \multirow[t]{2}{*}{Total} & & 241 & 958 & 1199 & \\
\hline & \% & 20.1 & 79.9 & & \\
\hline
\end{tabular}

```

Convergence at Iteration 5
Input 0.191
Group \# 4 -- B: 0.571, E: 0.710, G: 0.397, O: 0.855
Log likelihood = -622.073 Significance = 0.000
Run \# 6, 3 cells:
Convergence at Iteration 4
Input 0.201
Group \# 5 -- 0: 0.427, 1: 0.461, 2: 0.620
Log likelihood = -633.731 Significance = 0.000
Add Group \# 3 with factors OgeBEGo
Level \# 2 ----------
Run \# 7, 25 cells:
Convergence at Iteration 6
Input 0.183
Group \# 1 -- M: 0.608, m: 0.422, f: 0.431, F: 0.536
Group \# 3 -- O: 0.722, g: 0.496, e: 0.786, B: 0.616, E: 0.724, G:
0.373, o: 0.657
Log likelihood = -590.071 Significance = 0.009
Run \# 8, 48 cells:
Convergence at Iteration 6
Input 0.179
Group \# 2 -- O: 0.486, g: 0.458, e: 0.738, B: 0.603, E: 0.607, G:
0.442, o: 0.678
Group \# 3 -- O: 0.696, g: 0.501, e: 0.779, B: 0.644, E: 0.691, G:
0.375, o: 0.670
Log likelihood = -576.486 Significance = 0.000
Run \# 9, 35 cells:
Convergence at Iteration 6
Input 0.177
Group \# 3 -- O: 0.705, g: 0.501, e: 0.774, B: 0.623, E: 0.690, G:
0.378, 0: 0.652
Group \# 4 -- B: 0.554, E: 0.685, G: 0.416, O: 0.838
Log likelihood = -580.832 Significance = 0.000
Run \# 10, 21 cells:
Convergence at Iteration 5
Input 0.183
Group \# 3 -- O: 0.708, g: 0.494, e: 0.785, B: 0.632, E: 0.717, G:
0.374, o: 0.663
Group \# 5 -- 0: 0.438, 1: 0.463, 2: 0.610
Log likelihood = -587.649 Significance = 0.000
Add Group \# 2 with factors OgeBEGo
Level \# 3
Run \# 11, 112 cells:
Convergence at Iteration 6
Input 0.176
Group \# 1 -- M: 0.623, m: 0.447, f: 0.423, F: 0.526
Group \# 2 -- O: 0.486, g: 0.453, e: 0.740, B: 0.597, E: 0.619, G:
0.444, 0: 0.667

```
```

Group \# 3 -- O: 0.705, g: 0.499, e: 0.775, B: 0.636, E: 0.693, G:
0.376, o: 0.665
Log likelihood = -571.146 Significance = 0.014
Run \# 12, 122 cells:
Convergence at Iteration 9
Input 0.177
Group \# 2 -- O: 0.454, g: 0.481, e: 0.692, B: 0.591, E: 0.508, G:
0.458, o: 0.613
Group \# 3 -- O: 0.694, g: 0.504, e: 0.773, B: 0.638, E: 0.676, G:
0.377, o: 0.662
Group \# 4 -- B: 0.541, E: 0.615, G: 0.441, 0: 0.765
Log likelihood = -571.501 Significance = 0.019
Run \# 13, 107 cells:
Convergence at Iteration 6
Input 0.179
Group \# 2 -- O: 0.489, g: 0.469, e: 0.706, B: 0.589, E: 0.618, G:
0.446, o: 0.672
Group \# 3 -- O: 0.694, g: 0.498, e: 0.778, B: 0.645, E: 0.694, G:
0.376, o: 0.670
Group \# 5 -- 0: 0.474, 1: 0.482, 2: 0.550
Log likelihood = -575.172 Significance = 0.273
Add Group \# 1 with factors MmfF
---------- Level \# 4 ----------
Run \# 14, 228 cells:
Convergence at Iteration 9
Input 0.173
Group \# 1 -- M: 0.613, m: 0.439, f: 0.421, F: 0.532
Group \# 2 -- O: 0.459, g: 0.476, e: 0.693, B: 0.582, E: 0.518, G:
0.461, o: 0.600
Group \# 3 -- O: 0.705, g: 0.502, e: 0.768, B: 0.628, E: 0.676, G:
0.379, o: 0.659
Group \# 4 -- B: 0.540, E: 0.614, G: 0.442, O: 0.782
Log likelihood = -566.097 Significance = 0.018
Run \# 15, 217 cells:
Convergence at Iteration 7
Input 0.176
Group \# 1 -- M: 0.628, m: 0.455, f: 0.419, F: 0.524
Group \# 2 -- O: 0.485, g: 0.465, e: 0.710, B: 0.583, E: 0.632, G:
0.449, o: 0.656
Group \# 3 -- O: 0.704, g: 0.496, e: 0.774, B: 0.638, E: 0.696, G:
0.377, 0: 0.665
Group \# 5 -- 0: 0.472, 1: 0.482, 2: 0.553
Log likelihood = -569.747 Significance = 0.252
Add Group \# 4 with factors BEGo
Level \# 5
Run \# 16, 347 cells:
Convergence at Iteration 9
Input 0.173
Group \# 1 -- M: 0.619, m: 0.446, f: 0.418, F: 0.529

```
```

Group \# 2 -- O: 0.461, g: 0.486, e: 0.667, B: 0.572, E: 0.548, G:
0.464, O: 0.580
Group \# 3 -- O: 0.704, g: 0.499, e: 0.767, B: 0.630, E: 0.678, G:
0.380, o: 0.659
Group \# 4 -- B: 0.539, E: 0.597, G: 0.445, o: 0.803
Group \# 5 -- 0: 0.474, 1: 0.483, 2: 0.548
Log likelihood = -564.973 Significance = 0.331
No remaining groups significant
Groups selected while stepping up: 3 2 1 4
Best stepping up run: \#14
Stepping down...
Level \# 5
Run \# 17, 347 cells:
Convergence at Iteration 9
Input 0.173
Group \# 1 -- M: 0.619, m: 0.446, f: 0.418, F: 0.529
Group \# 2 -- O: 0.461, g: 0.486, e: 0.667, B: 0.572, E: 0.548, G:
0.464, o: 0.580
Group \# 3 -- O: 0.704, g: 0.499, e: 0.767, B: 0.630, E: 0.678, G:
0.380, o: 0.659
Group \# 4 -- B: 0.539, E: 0.597, G: 0.445, O: 0.803
Group \# 5 -- 0: 0.474, 1: 0.483, 2: 0.548
Log likelihood = -564.973
Level \# 4
Run \# 18, 204 cells:
Convergence at Iteration 9
Input 0.176
Group \# 2 -- O: 0.459, g: 0.490, e: 0.665, B: 0.580, E: 0.534, G:
0.462, o: 0.596
Group \# 3 -- O: 0.693, g: 0.501, e: 0.772, B: 0.639, E: 0.678, G:
0.378, o: 0.662
Group \# 4 -- B: 0.541, E: 0.598, G: 0.444, O: 0.789
Group \# 5 -- 0: 0.474, 1: 0.484, 2: 0.547
Log likelihood = -570.431 Significance = 0.013
Run \# 19, 189 cells:
Convergence at Iteration 7
Input 0.174
Group \# 1 -- M: 0.608, m: 0.428, f: 0.423, F: 0.536
Group \# 3 -- O: 0.712, g: 0.495, e: 0.766, B: 0.618, E: 0.689, G:
0.381, o: 0.652
Group \# 4 -- B: 0.550, E: 0.641, G: 0.427, o: 0.863
Group \# 5 -- 0: 0.453, 1: 0.471, 2: 0.585
Log likelihood = -570.349 Significance = 0.097
Run \# 20, 123 cells:
Convergence at Iteration 10
Input 0.187
Group \# 1 -- M: 0.606, m: 0.447, f: 0.404, F: 0.538
Group \# 2 -- O: 0.475, g: 0.486, e: 0.673, B: 0.559, E: 0.599, G:
0.462, o: 0.562

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Group \# 4 -- B: 0.555, E: 0.610, G: 0.429, O: 0.837
Group \# 5 -- 0: 0.467, 1: 0.482, 2: 0.556
Log likelihood = -602.608 Significance = 0.000
Run \# 21, 217 cells:
Convergence at Iteration 7
Input 0.176
Group \# 1 -- M: 0.628, m: 0.455, f: 0.419, F: 0.524
Group \# 2 -- O: 0.485, g: 0.465, e: 0.710, B: 0.583, E: 0.632, G:
0.449, o: 0.656
Group \# 3 -- O: 0.704, g: 0.496, e: 0.774, B: 0.638, E: 0.696, G:
0.377, 0: 0.665
Group \# 5 -- 0: 0.472, 1: 0.482, 2: 0.553
Log likelihood = -569.747 Significance = 0.024
Run \# 22, 228 cells:
Convergence at Iteration 9
Input 0.173
Group \# 1 -- M: 0.613, m: 0.439, f: 0.421, F: 0.532
Group \# 2 -- O: 0.459, g: 0.476, e: 0.693, B: 0.582, E: 0.518, G:
0.461, o: 0.600
Group \# 3 -- 0: 0.705, g: 0.502, e: 0.768, B: 0.628, E: 0.676, G:
0.379, ○: 0.659
Group \# 4 -- B: 0.540, E: 0.614, G: 0.442, o: 0.782
Log likelihood = -566.097 Significance = 0.331
Cut Group \# 5 with factors 012
---------- Level \# 3 ----------
Run \# 23, 122 cells:
Convergence at Iteration 9
Input 0.177
Group \# 2 -- O: 0.454, g: 0.481, e: 0.692, B: 0.591, E: 0.508, G:
0.458, o: 0.613
Group \# 3 -- O: 0.694, g: 0.504, e: 0.773, B: 0.638, E: 0.676, G:
0.377, o: 0.662
Group \# 4 -- B: 0.541, E: 0.615, G: 0.441, O: 0.765
Log likelihood = -571.501 Significance = 0.014
Run \# 24, 89 cells:
Convergence at Iteration 6
Input 0.175
Group \# 1 -- M: 0.594, m: 0.413, f: 0.428, F: 0.543
Group \# 3 -- O: 0.716, g: 0.499, e: 0.767, B: 0.612, E: 0.691, G:
0.380, o: 0.650
Group \# 4 -- B: 0.556, E: 0.680, G: 0.415, o: 0.856
Log likelihood = -574.615 Significance = 0.010
Run \# 25, 77 cells:
Convergence at Iteration 8
Input 0.188
Group \# 1 -- M: 0.600, m: 0.440, f: 0.407, F: 0.540
Group \# 2 -- O: 0.475, g: 0.477, e: 0.703, B: 0.570, E: 0.572, G:
0.457, 0: 0.585
Group \# 4 -- B: 0.555, E: 0.628, G: 0.426, o: 0.817
Log likelihood = -604.281 Significance = 0.000
Run \# 26, 112 cells:

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Convergence at Iteration 6
Input 0.176
Group \# 1 -- M: 0.623, m: 0.447, f: 0.423, F: 0.526
Group \# 2 -- O: 0.486, g: 0.453, e: 0.740, B: 0.597, E: 0.619, G:
0.444, o: 0.667
Group \# 3 -- O: 0.705, g: 0.499, e: 0.775, B: 0.636, E: 0.693, G:
0.376, o: 0.665
Log likelihood = -571.146 Significance = 0.018
All remaining groups significant
Groups eliminated while stepping down: 5
Best stepping up run: \#14
Best stepping down run: \#22

```

\section*{APPENDIX C - SOCIAL NETWORK}


\section*{APPENDIX D - ENGLISH ABSTRACT}

This study attempts to establish patterns of code choice in informal conversations among students at the upper-secondary level of Vienna Bilingual Schooling, a German-English bilingual program within the mainstream Austrian educational system. An introductory section presents concepts, models, and theories within the fields of bilingualism research, code choice, and linguistic identity. In the empirical study itself, quantitative data is collected by means of a questionnaire survey, and analyzed using multivariate analysis (multiple logistic regression). The results of this statistical procedure are discussed in light of some qualitative data. This qualitative data comes from a qualitative section on the questionnaires, as well as from observation and interviews.

The empirical study demonstrates that within the limited context of informal interactions at Vienna Bilingual Schooling, conversational partners generally arrive at a uniform code (overt accommodation), which is primarily determined by the social attributes of the participants. The home language backgrounds of speaker and addressee are the factors most predictive of code choice, followed by the educational language background of the speaker. Because of the strength of the first two variables and the numerical dominance of German language backgrounds, the predominant language in informal conversations is German. A secondary analysis on the use of mixed codes establishes that gender constellation is another salient factor in this context, with intra-gender conversations slightly favoring mixed codes, and inter-gender conversations slightly disfavoring them.

In the discussion of the results it is suggested that, in addition to the linguistic competence principle, social norms and issues of linguistic identity are important in the relationship between home language background and code choice.

Network analysis is employed to show how linguistic preferences might vary at the individual level, but how an active negotiation of identity is nevertheless circumscribed by wider sociolinguistic norms.

Finally, it is proposed that Vienna Bilingual Schooling is fairly well embedded in the expanding-circle context of Austrian society, generally replicating the central norm of territorial bilingualism in informal conversations. This is interpreted as a pointer towards the development of English in the expanding circle, where its increasing use within specific domains does generally not seem to correlate with a more widespread acceptance as a vernacular language.

\section*{APPENDIXE-GERMANABSTRACT}

Ziel dieser Studie ist die Feststellung von Sprachwahlmustern in informellen Konversationen zwischen SchülerInnen in Oberstufenklassen von Vienna Bilingual Schooling, einem Schulversuch im österreichischen Schulsystem in dem bilingual in Deutsch und English unterrichtet wird. Eine Einführung präsentiert Konzepte, Modelle und Theorien in den Bereichen Bilingualismusforschung, Sprachwahl und linguistische Identität. In der empirischen Studie selbst werden mittels Fragebögen quantitative Daten erhoben die sodann einer Multivariatanalyse (multiple logistische Regression) unterzogen werden. Die Ergebnisse dieser Analyse werden unter Einbezug qualitativer Datenquellen diskutiert. Diese qualitativen Elemente stammen aus einem qualitativen Teil auf dem Fragebogen, sowie aus Observation und strukturierten Gesprächen.

Die empirische Studie zeigt, dass im eingeschränkten Kontext von informellen Konversationen an Vienna Bilingual Schooling grundsätzlich eine Einigung auf ein gemeinsames Sprachmuster statt findet (overt accomodation), welches primär von den sozialen Attributen der Beteiligten abhängig ist. Die familiäre(n) Umgangssprache(n) der KonversationspartnerInnen sind die Faktoren die die Sprachwahl am stärksten beeinflussen, gefolgt von der/den Sprache(n) der bisherigen schulischen Laufbahn. Aufgrund der Stärke des ersteren Faktors, sowie der numerischen Überzahl von SchülerInnen mit deutscher Umgangssprache, ist Deutsch die vorherrschende Sprache in informellen Konversationen. Einen sekundäre Analyse zum Gebrauch von mixed codes ergab, dass die Geschlechterkonstellation ein weiterer signifikanter Faktor in dieser Hinsicht ist, wobei gleichgeschlechtliche Konstellationen den Gebrauch
von mixed codes leicht fördern, währen \(z w i s c h e n g e s c h l e c h t l i c h e ~\) Konstellationen leicht hemmend wirken.

In der Diskussion der Ergebnisse wird postuliert, dass neben der Sprachkompetenz auch soziale Normen und Fragen der Identität für den Konnex zwischen familiärer/en Umgangssprachen(n) und Sprachwahl verantwortlich sind. Eine Netzwerkanalyse zeigt, dass obwohl individuelle linguistische Präferenzen existieren, der Ausdruck linguistischer Identitäten immer von größerflächigen sozialen Normen umschrieben bleibt.

Abschließend wird festgestellt, dass Vienna Bilingual Schooling im weiterführenden sozialen Umfeld der expanding-circle Gesellschaft Österreichs eingebettet ist und somit zentrale Normen wie die des territorialen Bilingualismus repliziert. In letzter Instanz wird das als Indikator für die Entwicklung des Englischen im expanding circle gesehen, in dem die Sprache zwar zunehmend in gewissen Sprachdomänen verwendet wird, diese Entwicklung jedoch nicht mit einem vermehrten Gebrauch des Englischen als Umgangssprache einhergeht.

\section*{APPENDIX F - CURRICULUM VITAE}

Note: following the guidelines of the university's style sheet, this CV contains only academically relevant information and is not to be viewed as a general-purpose resume.

June 2009 MA thesis "Bilingualism, code choice, and identity: a sociolinguistic survey of peer-to-peer interaction at Vienna Bilingual Schooling" submitted to the Faculty of Philological and Cultural Studies University of Vienna

Sep 2005 to May 2006 JOINT STUDY exchange student Faculty of Arts and Science University of Toronto [cumulative GPA 3.91 North American scale]
from Oct 2002 Diplomstudium Anglistik und Amerikanistik (English and American Studies) University of Vienna
[cumulative GPA 1.17 Austrian scale]```


[^0]:    1 These data come from my personal communication (e.g. 18 April 2007) with Stuart Simpson, chief officer for bilingual programs at Europabüro, Stadtschulrat für Wien (Vienna Board of Education).

[^1]:    2 Some forms of upper secondary schooling in Austria encompass four years, others five. Students from both of these forms participated in the study.

[^2]:    3 Limited in scope, however, to the linguistic achievement in English by students who have German as their home language.

[^3]:    4 English in the expanding circle has traditionally been studies within the framework of second language acquisition (SLA) and, only much more recently, within the context of English as a lingua franca (ELF, cf. Seidlhofer 2001).

[^4]:    5 It is interesting to note that Kuhn (1970: 15), from his perspective in the 1960s, suggests that this is a function of the social sciences' relative immaturity; however, the last half-century has seen a constant rise in the role and status of the social sciences, without the paradigmatic narrowing that Kuhn foresaw, leading one to believe that - important parallels notwithstanding - the social and natural sciences cannot be seen as absolute equivalents in terms of their functions and methodologies.

[^5]:    6 For a more in-depth discussion of this topic, see Heller (2007: 1-5), as well as Heller's own source, Hobsbawm (1990: 102).

[^6]:    7 That is, high linguistic competence acquired outside any putative critical or sensitive period.
    8 Sometimes, but not always used interchangeably with the term early childhood bilingualism.

[^7]:    9 This is very close to Milroy \& Muysken's (1995: 7) assertion, already quoted in the introduction, that code switching is the central issue within bilingualism research.
    10 A domain, in this context, is "an abstraction which refers to a sphere of activity representing a combination of specific times, settings and role relationships" (Romaine 1995: 33).

[^8]:    11 Fishman (1976, 1: 290) eschews this issue by writing exclusively about Quebec, which from his perspective in the 1960s and 1970s he can still characterize as diglossic. Certainly, it must be stressed that the nation state should not be the only entity in social research; yet at the same time, it would be difficult to deny a country like Canada the status of a society meaning a model should be able to accommodate a community of this type.

[^9]:    12 Meaning fluent in Greek in addition to their native Latin.

[^10]:    14 Revealingly, the term 'remedial' instruction is sometimes applied to these programs in the non-linguistic literature (Lyons 1996: 2).
    15 This could be termed the cultural-hegemonic view, or in Baker's (2006: 383) words, the "language as a problem" perspective.

[^11]:    16 This argument is exemplified in the Ebonics debate in the US (cf. Baugh 2000: 37ff), i.e. the debate about the use of AAVE in American inner-city classrooms.

[^12]:    17 Another factor, which is largely of interest from a pedagogical perspective, would be how the two languages are employed in the classroom.

[^13]:    19 I.e. those with more network ties outside, as opposed to inside, the community.

[^14]:    20 Models of code switching are informed by data involving several dialects as well as several languages. As this study clearly deals with a bilingual setting, the terms code and language will be used interchangeably by me. Similarly, there exists a theoretical distinction between code switching and code mixing, which is mostly relevant from an internal, linguistic point of view. From a sociolinguistic perspective, this contrast is usually not of primary concern.
    21 This of course presupposes that speakers have a notion of which code is the most appropriate in a given social situation or relationship. This point relates back to our discussion of diglossia in section 2.1.2, and receives additional attention in the markedness model to be discussed shortly

[^15]:    22 Though the markedness model can also cope well with metaphorical switches. Nevertheless, the emphasis in explanatory terms lies on situational factors.

[^16]:    23 This issue is of course directly related to the discussion above about different conceptualizations of linguistic communities and doubts about he generality of norms across large speech communities.

[^17]:    24 For instance the way speech rates are adapted in such conversations, often to the extent of over-accommodation.
    25 In the sense that different cultures will have different RO sets.

[^18]:    26 It is here that definition (c) acquires salience, as it explicitly mentions what type of psychological information we might be interested in, viz. values (positive or negative), which in the case of linguistic identity would be an individual's language attitudes.

[^19]:    27 It must be said, however, that we face similar challenges with purely linguistic data, in that it will often prove difficult to collect naturalistic data on a specific research question. This issue will be discussed in greater depth in section 3.2.1.

[^20]:    29 And surely many other, non-linguistic factors; but the concern in this study is primarily with the linguistic aspects of identity.

[^21]:    30 Which contrasted the traditional survey methodology with more complex approaches such as social network theory.

[^22]:    31 Because of possible confusion of the abbreviation VBS, which can also mean Vienna Business School, the designation VBS is not used locally at this school. Nevertheless, legally and pedagogically, it operates under the umbrella of Vienna Bilingual Schooling.
    32 For special provisions made for literacy education at the elementary level, see Hüttner (1997: 89)

[^23]:    33 It might be noted that on a formal level, the categorization into English and German-speaking groups needs to be retained within the current pedagogical framework of VBS. The division is important in that it determines which language will be graded as a student's first language, and which as their second language in the language arts classes.

[^24]:    35 Which coincided with the maximum length of time recommended by Dörnyei (2003: 17).
    36 Another option would have been to alternate languages within each questionnaire. As code switching in written, non-literary texts is unusual and possibly confusing, I decided against this option.

[^25]:    37 Compared to having the teachers administer the questionnaires.
    38 And possibly at the upper-secondary level, if they had transferred from another school at a later point.

[^26]:    42 Especially if the different variables are meant to form part of a comprehensive statistical model.

[^27]:    43 However, very large is a relative term, and multivariate analysis usually requires much larger sample sizes than simpler statistical setups would.
    44 Of course, this approach is not specific to multivariate analysis. However, as multivariate analysis has a relatively stringent criterion as to the factors that are included in the model (see below), the point is especially relevant.

[^28]:    45 This customary threshold is used by GoldvarbX at all stages, so significance from here on always refers to significance at the .05 level.

[^29]:    46 In the sense that this term is used here, my questionnaire data are natural data, since there is no possibility to control the combination of independent variables found within each item (unlike in an experiment).

[^30]:    47 Such as capricious factor weights that fluctuate highly as the analysis proceeds.

[^31]:    48 I can, of course, by no means speak of having randomly sampled the two locations from the totality of schools offering Vienna Bilingual Schooling at the upper secondary level.
    Nevertheless, there is a clear argument to be made in favor of collecting data from more than one school, even if the criteria of statistical generalizability are not strictly being met.

[^32]:    49 It might be remembered that only students sitting very close to each other in the classroom would have had a chance to compare each others' responses, and even this was not encouraged.

[^33]:    50 Strictly speaking, this item stands for two variables in the analysis, as both the home language background of respondent/speaker, and that of the putative interlocutor were part of the analysis. However, the way these two variables were coded is identical.

[^34]:    51 The application value is the value of the variable that the percentages and factor weights are denominated in. For example, if English is the application value, a percentage of 70 means that 70 percent of the conversational pairings use English rather than the other way around.

[^35]:    52 Several students, especially migrants from the Indian subcontinent and South-East Asia reported that they commonly used English, German, and a third language at home.

[^36]:    53 With very few exception this meant within the context of Vienna Bilingual Schooling.

[^37]:    57 Meaning the factor levels would be ranked completely differently on the basis of the raw percentages.

[^38]:    59 Meaning the factor has to be interpreted with some caution.
    60 Multivariate analysis does not, strictly speaking, identify which contrasts within a factor are significant; the numbers in this case being as clear-cut as they are, however, patently suggest that we have two homogeneous subsets: $\{\mathrm{M}, \mathrm{F}\}$, and $\{\mathrm{m}, \mathrm{f}\}$.

[^39]:    61 A claim by Milroy (1987b: 185) that has already been quoted in the methodology section.
    62 As a footnote, it might be mentioned that I did not observe this pattern among the teachers at the (upper) secondary level. My research gave me the opportunity to spend some time in the two teachers' lounges, and a remarkable number of conversations between German-speaking and English-speaking teachers were conducted exclusively in English. This was true especially for the younger generation of the faculty. We could interpret this discrepancy as the result of a different social environment (more academically oriented), as a change in progress, or as the result of both.

[^40]:    64 My assumption here is that students are not sent to Vienna Bilingual Schooling against their wishes. This should be especially true for German-language students, who would have a plethora of alternative options. The same cannot necessarily be assumed for English or thirdlanguage students, whose option are much more limited by availability and issues of cost. Despite this, they tend to show an equal if not greater willingness to use a foreign language in their informal conversations.

[^41]:    65 Approximately half of the comments were in English and the other half in German. Almost invariably, students followed the language of their questionnaire, providing further evidence that overt accommodation is an important linguistic principle in this population. An awareness of this was expressed by one student in relation to the final item on page three of the questionnaire, which asked students which language they would rather use to make a good impression on a teacher. She responded that you cannot really put it that way, because the polite thing is to respond in the language the other person is using.

[^42]:    66 Appropriately enough, the student starts her comment in German in response to the German question on her questionnaire, but adds final emphasis by mixing in an English mot juste.

[^43]:    67 And indeed, not all comments did. However, those that were more positive generally expressed the same attitudes towards switches in both direction, and in many instances were rather non-committal.
    68 Part of our interview was conducted in English, so I had a chance to ascertain this myself.

[^44]:    69 By this they did not mean that they were unaware of the multilingual backgrounds of their fellow students, but rather that German was the clear and persistent unmarked code in conversations with them.

[^45]:    70 For the other student, only insufficient data was available.
    71 The special position of the very small group who received their education mostly in a third language has already been discussed.

[^46]:    73 Visible from the facts that they teach exclusively in English, charge tuition fees, do not necessarily follow the national curriculum, etc.

[^47]:    74 Correspondingly, the statements by students quoted in the previous section underlined the importance of identity-related factors in code choice at Vienna Bilingual Schooling.

