The role of code-switching in psycholinguistic models of multilingual competence

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Odjel za lingvistiku

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Abstract

Code-switching is a very frequent behavior observable in multilingual speakers and a typical feature of their so-called multilingual competence. A literature review has shown that models of multilingual competence do not adequately take into account code-switching. This thesis focuses on analyzing how three prominent models of multilingual competence account for code-switching. The chosen models are: The language switches model (Williams & Hammarberg, 2005), which is a developmental model explaining language production, the multilingual processing model (Meißner, 2004), which is a model focused on intercomprehensive language processing, and the dynamic model of multilingualism (Herdina & Jessner, 2002), a dynamic model of multilingual language development. The models are evaluated according to the following, previously established, criteria: The general role and the properties of code-switching taken into account by the model, the focus of the model, and the view of other psycholinguistic aspects of multilingual competence. It is concluded that each chosen model represents a different part of language acquisition and that, through their review, a useful insight into the phenomenon of multilingual competence is gained.

Key words: *multilingualism, multilingual competence, code-switching, psycholinguistics, models of multilingualism*

Sadržaj

Promjena kodova vrlo je česta pojava kod višejezičnih govornika i vrlo je važno svojstvo njihove takozvane višejezične kompetencije. Pregled literature pokazao je da modeli višejezične kompetencije ne uzimaju dovoljno u obzir promjenu kodova. Ovaj završni rad analizira kako tri ugledna modela višejezične kompetencije uzimaju u obzir promjenu kodova. Odabrani modeli su: "The language switches model" (Williams & Hammarberg, 2005), razvojni model koji objašnjava jezičnu produkciju, "the multilingual processing model" (Meißner, 2004), model koji se usredotočava na jezičnu obradu putem međusobnog razumijevanja i "The dynamic model of multilingualism" (Herdina & Jessner, 2002), dinamički model višejezičnog jezičnog razvoja. Modeli se vrednuju prema sljedećim, prethodno utvrđenim, kriterijima: Opća uloga i svojstva promjene kodova koje model uzima u obzir, fokus modela i pogled na druge psiholingvističke aspekte višejezične kompetencije.

Zaključeno je da svaki od odabranih modela predstavlja različite aspekte usvajanja jezika i da se pomoću njihove analize stječe koristan uvid u fenomen višejezične kompetencije.

Ključne riječi: *višejezičnost, višejezična kompetencija, promjena kodova, psiholingvistika, modeli višejezičnosti*

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1. Introduction

For many speakers in the present world, multilingualism is not a desire but rather a necessity. Over half of the global population is able to speak more than one language (Aronin, 2022, p. 11). Over the years, there has been much research done on multilingualism and on the phenomena that occur during multilingual speech production. One of the phenomena with very high occurrence is ***code-switching***, which is mainly defined as the ability to switch between languages (Treffers-Daller et al., 2021). There is much literature on code-switching, and throughout it, it is accepted as an important phenomenon and typical behavior of multilingual speakers. However, in the few psycholinguistic models of multilingual competence that exist, code-switching is not taken into account to a greater extent. The goal of the thesis is to delve into the extent of inclusion of code-switching in three chosen psycholinguistic models of multilingual competence.

The motivation for this thesis came from the fact that the theoretical study of multilingualism and all phenomena connected to it is not researched enough (Marx & Hufeisen, 2003, p. 179), especially with respect to theoretical aspects of code-switching. Multilingualism has only recently become a true interest of researchers (Aronin, 2022), and code-switching research was mostly done on bilingual speakers (for example, Poplack, 1980; Soares & Grosjean, 1984; Costa & Santesteban, 2004; Broersma & De Bot, 2006; Myslín & Lévy, 2015, among others). However, there was some research done on code-switching in multilingual speakers, such as in Williams and Hammarberg (2005), Migge (2014), Beyer (2014), Kroff et al. (2023), for example. All of these studies treat code-switching as an important and frequent phenomenon. Moreover, only a few models deal specifically with multilingualism, its characteristics, and its development. Some well-known models of multilingualism that exist are: *The language switches model* by Sarah Williams and Björn Hammarberg (Williams & Hammarberg, 2005), *The dynamic model of multilingualism* by Philip Herdina and Ulrike Jessner (Herdina & Jessner, 2002), *The multilingual processing model* by Franz-Joseph Meißner (Meißner, 2004), *The factor model* by Britta Hufeisen (Hufeisen, 2005), etc. The first three models mentioned will be the ones analyzed in this thesis, and the role of code-switching in them will be discussed. These three models were chosen to be discussed because they each are psycholinguistic models concentrating on individual multilingualism while explaining different aspects of multilingualism, thus, by considering them, a valuable contribution to the theoretical exploration of central psycholinguistic aspects of multilingual competence can be made.

This thesis will start with a short explanation of the research questions and the goals of this theoretical study. In the third chapter, the most important theoretical terms – *multilingualism and multilingual competence, psycholinguistic aspects of multilingual competence, and code-switching and related phenomena* – will be discussed and analyzed, and a literature review will be done. The fourth chapter will present a list of criteria for analyzing the psycholinguistic models of multilingual competence, such as the appearance, definition, role, and properties of code-switching in the chosen models, the focus of the model, and the view of other psycholinguistic aspects of multilingual competence. In the fifth chapter, the models of multilingual competence will be discussed and analyzed according to the criteria proposed in the previous chapter. The differences and similarities between the models will be considered. And lastly, in the sixth chapter, an overview of the main insights of the thesis will be given and a conclusion of the thesis will be presented.

2. Research questions, goals, and methods

This thesis is a theoretical one containing an overview of different models of multilingual competence. The chosen models will be analyzed based on the established criteria.

The research question pursued in this thesis consists of analyzing the representation and role of code-switching in different psycholinguistic models of multilingual competence. Likewise, different aspects of code-switching will be discussed, and their (in)adequate representation in the chosen models will be analyzed. Moreover, questions about the processing and storage of multilinguals' languages, their connection and (dis)activation will try to be further explained. These aspects will also be analyzed with reference to how they are represented in the chosen models.

The most important goal of the thesis is to analyze the role and representation of code-switching in the chosen models of multilingual competence, along with other aspects of multilingual processing and production, such as the ability to (dis)activate languages and the number of systems in the mind. This will be accomplished by reviewing the relevant literature, by analyzing the theoretical approaches, and, of course, the models of multilingual competence. The definitions of the terms relevant for the thesis, such as multilingualism, bilingualism and their differences and similarities, multilingual competence and metalinguistic awareness, and, of course, code-switching, will be given and discussed. Moreover, code-switching and the terms closely related to it, such as cross-linguistic influence, transfer, code-mixing, borrowing, code-crossing, etc., will be defined, exemplified, and differentiated. Furthermore, criteria that will serve as the basis for analyzing the models

will be proposed. The first criterion is obviously code-switching and its inclusion, definition, and role in the models. The second criterion is the focus of the model, given that each model focuses on different aspects of multilingual competence. And the last, third, criterion refers to the view of other psycholinguistic aspects of multilingual competence in the model, such as the processing, production, and separation or integration of the multilinguals' languages. These criteria will serve as a guide through the analysis of the models, which will be evaluated on the basis of them. If necessary, the models will be expanded on the basis of the established criteria. Another goal of the thesis is to contribute to the theoretical study of multilingualism, to gather deeper knowledge of it and the phenomena that are a part of it, to possibly complement the models that will be analyzed, and to try to give some new insights into the research on the topic.

3. Key theoretical terms and a literature review

The central theoretical terms and concepts relevant for this thesis will be defined in the following.

3.1. Multilingualism and multilingual competence

In this thesis, ***multilingualism*** will be defined as a speaker's ability to use three or more languages and will be differentiated from ***bilingualism***, which is the ability to use two languages. The literature is very divided on the exact definition of these terms (see Aronin, 2022; Aronin & Singleton, 2012; Marini & Fabbro, 2007).

Firstly, what exactly does it mean to use a language? What level of proficiency does one need to have to be able to say that one can use a language? How often does one need to use a language to be able to call oneself bi-/multilingual? These are just some of the multitude of questions that come up when one is attempting to define these terms.

Secondly, there are some authors who do not make a difference between these two terms, such as Kroll and De Groot (2005) "I use the terms bilingualism and multilingualism interchangeably to refer to the use of two or more languages by individual speakers and groups of speakers, as is common in the literature in the field" (p. 433) and Grosjean (2012a):

> The words "bilingual" and "bilingualism" have many different meanings depending on the context they are used in. They can include the knowledge and use of two or more languages (…) the recognition of two or more languages, and so on (…) we will define bilingualism, and indeed multilingualism, as the use of two or more languages (or dialects) in everyday life. (p. 5)

In the citations above, it is evident that the terms are not differentiated. However, there are other authors that clearly make a difference between the two, such as Marini and Fabbro (2007), who point out that proficiency and the age of acquisition of the language(s) are not an obstacle when defining bi-/multilingualism (p. 5). Moreover, Aronin (2022) specifies that

> both [bilingualism and multilingualism] can be described as an individual's use of at least one more language beyond the mother tongue (…) It has become increasingly clear that similarities between bilingualism and multilingualism do not mean that they are identical. Evidence from multidisciplinary research (…) has revealed meaningful differences between the two. (p. 13)

Both authors indicate that multilingualism is not a mere extension of bilingualism (Aronin, 2022, p. 13), but rather the opposite, that bilingualism is a type of multilingualism (Marini & Fabbro, 2007, p. 5). Or, as Herdina and Jessner (2002) assume, "bilingualism is the simplest form of multilingualism" (p. 132), given that the acquisition of another language in a bilingual speaker leads to essential changes. This distinction is very important because a bi-/multilingual person "is not the sum of two complete or incomplete monolinguals; rather, he or she has a unique and specific linguistic configuration" (Grosjean, 1989, p. 3). Multilingualism should not be seen merely as an addition of another language (Aronin, 2022, p. 13), and a multilingual person should be seen as a whole, with its specificities and specialties (Grosjean, 1989).

Lastly, if one compares the features of bilingual and multilingual acquisition, speech production and comprehension, it will become apparent how different the two terms are and why bilingualism is seen as a type of multilingualism rather than vice versa. This is supported by psycholinguistic research that has shown that acquiring a second language or two languages simultaneously is psycholinguistically different from acquiring a third, fourth, fifth, etc. language (e.g. Britta Hufeisen's factor model (2005)). Herdina and Jessner (2002), within their ***dynamic model of multilingualism***, which will be discussed in the later chapters, also claim that "the need to deal with more than one language in a multilingual system will lead to the development of certain skills (…) in the language speaker which will facilitate the acquisition and maintenance of further language systems" (p. 143). This is also confirmed by De Angelis (2005) who, within her studies of non-native lexical transfer in multilingual language learners, observed that multilingual speakers display behaviors that bilinguals do not. In the studies, a term *system shifts* is also introduced, which is "a shift in lexical knowledge from a source to a guest system" (p. 2) and two factors are identified that might

favor a system shift: *perception of correctness* and *association of foreignness*. The former refers to the ability to identify what is accurate or inaccurate target language output and to resist including linguistic knowledge from the L1 when producing the target language (p. 11). The latter refers to the association that is established between non-native languages, which get assigned the status of foreign languages (p. 11).

Similarly, Aronin (2022) commented on some qualitative and quantitative differences between bi- and multilinguals. She mentioned the fact that with the addition of a new language, new linguistic concepts are reached, the vocabulary is expanded, more variables need to be considered, there are more cross-linguistic, interactions and there is a possibility of non-native languages interacting and influencing each other (pp. 125-126). Taking into account the phenomenon of code-switching, there are more languages the speaker can switch to and from, which, together with the aspects mentioned above, makes a multilingual system specific and much more complex than a bilingual system.

Moreover, Marx and Hufeisen (2003) point out that teachers of a third language (L3) often have an advantage in their classroom because their students have priorly learned another language and hence have developed their own methods of learning languages and have acquired a deeper understanding of languages themselves (p. 196). This is also confirmed by Cenoz (2003), as cited in Jessner (2008) "most studies on general proficiency indicate a positive effect of bilingualism on TLA [third language acquisition] and this effect can be explained as related to learning strategies, metalinguistic awareness, and communicative ability" (p. 277). Regarding learning strategies, Kemp (2007), within his study of the use of grammar learning strategies in bi- and multilingual participants, discovered that the participants who knew more languages used more and somewhat different learning strategies than the bilingual participants. It can be inferred from this that people who have previously only acquired their first language (L1) have a harder time acquiring a second language (L2) than those who have already acquired an L2 and are learning an L3. That might be due to the fact that multilinguals, when compared to bilinguals, have a higher *metalinguistic awareness*, which is "the ability to focus on linguistic form and to switch focus between form and meaning" (Jessner, 2008, p. 277), or, in other words, the ability to talk and think about language while using language. With higher metalinguistic awareness comes increased ***multilingual competence***, which Cook (2016) defines as "the knowledge of more than one language in the same mind or the same community" (p. 2). This term is connected to and includes multilingual production and processing. Code-switching is also an important manifestation of multilingual competence.

Since multilingualism encompasses many different disciplines and has its foundations in them, its research methods are very broad. Aronin (2022) states that "multilingualism research includes methods of natural science, (…) life sciences and humanities and social sciences" (p. 174) and hence, depending on the disciplinary root of multilingualism, research methodologies depend on the "research philosophies accepted in the field of origin" (Aronin, 2022, p. 174). However, she does mention three types of research used in multilingualism: *quantitative research*, *qualitative research*, and *holistic and complexity research*.

Quantitative research is concerned with numbers, neutrality, removing bias, and making the findings applicable on a larger scale (p. 179). Within multilingualism research, it can be used to measure language use, attitude, and behavior towards language, to describe the language demography, etc. (p. 180).

Qualitative research, on the other hand, is more open to interpretation, biases, and descriptions of different phenomena. Within multilingualism research, it is used in the form of "questionaries and interviews, observations, (…) discourse analysis" (p. 182), to explain and portray the meaning of certain phenomena, etc.

And lastly, *holistic and complexity research* is a different, but very important type of research in many disciplines, especially in multilingualism. It sees a multilingual system as complex and tries to encompass a complete picture of the area studied (p. 183).

Aronin (2022) also mentions a fourth type of research, which combines two or more methods to get even more valid and plausible results, and it is called *triangulation* (p. 186). She also lists some challenges of multilingual research and indicates that one of them is that many researchers of multilingualism employ methods for studying bilingualism (p. 175). That mostly happens for practical reasons, because those research methods have already been tested and it has been proven that they work. Also, since the two terms have only recently started being differentiated, before it must have been thought that all the methods that work for bilingualism inherently must work for multilingualism. While that might be true for some methods, it may not be like that for all of them, since with the addition of more languages, more factors come into play, which consequently makes the research more complex.

In the literature, a distinction is made between *societal* and *individual* multilingualism. Aronin (2022) defines *individual multilingualism*, which will be the focus of this thesis, as an individual's use of languages, their multilingual identity, and their attitudes, behavior and emotions towards languages (p. 14). On the other hand, Aronin defines *societal multilingualism* as the use and handling of three or more languages within a community or a country (p. 15). On the same note, Aronin (2022) and Aronin and Singleton (2012) comment

on a few more terms that appear in the literature. *Bilinguality*, and hence *multilinguality*, which refer to individual bi- and multilingualism. A term *plurilinguality* also appears, which is equated with mutlilinguality. And *bilingualism* and *multilingualism,* which refer to societal bi- and multilingualism. Meißner (2004) further differentiates plurilingualism from multilingualism, explaining that plurilingualism results from organized learning and monitoring (p. 33), whereas multilingualism emerges from unplanned and uncontrolled exposure to the target language (p. 33). However, in this thesis, only the terms bilingualism and multilingualism will be used, as defined at the beginning of the chapter.

Finally, there are some phenomena that typically occur in multilingual (and hence bilingual) speech production. They will be explained in the further chapters, some of them being: code-switching, borrowing, cross-linguistic influence, code-crossing, etc.

3.2. Psycholinguistic aspects of multilingual competence

Psycholinguistics is a branch of linguistics that "focuses on the cognitive mechanisms and knowledge structures underlying language production, comprehension, and acquisition" (Kootstra, 2014, p. 41). Over the years, many papers have been written on the topic of language processing in mono- and bilinguals and a few about multilinguals, many of them mentioning its psycholinguistic aspects. Many of them have asked questions such as: How exactly are bi-/multilinguals' languages stored and processed? Are they kept separate? Are they connected and if yes, how? Is one language turned off when the other one is being used? (for example, Grosjean, 2012a; Marini & Fabbro, 2007; Kootstra, 2014, among others). Some of the research done on the topic has dealt with the *monolingual bias*, which is the assumption that a monolingual speaker is the norm and that bi- and multilingual speakers are a mere sum of monolinguals. Grosjean (1989) tried to disprove this by saying "that the bilingual is an integrated whole which cannot easily be decomposed into two separate parts" (p. 6).

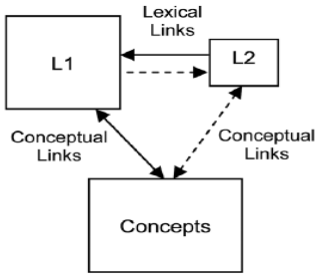
Several authors have tried to explain how bi- and multilinguals produce language. A very influential model explaining exactly that is ***De Bot's bilingual production*** model, adapted from Levelt's 'speaking' model (De Bot, 1992). Levelt's model (Levelt, 1989) is a monolingual production model based on three main processing components: *the conceptualizer, the formulator, and the articulator.* De Bot modified the model to make it suitable for explaining bilingual production. Williams and Hammarberg (2005) made some extensions to De Bot's model to make it apt for multilingual production. The model and all its extensions will be discussed in the next chapters.

Another important question is how bi- and multilinguals store their languages. Marini and Fabbro (2007) mention two opposite hypotheses that exist in the literature: *integrated lexicons* and *separate lexicons* (p. 11). The former points out that there is one lexicon for all languages that contains all the linguistic information and to which the new information is simply added. Languages (and hence the linguistic information) are distinguished with language tags. The latter indicates that there are several lexicons for each language. When a word is needed in one language, the lexicon of that language is simply searched.

Moreover, there is an interesting model that explains the way bilinguals access their languages, and it is the revised hierarchical model by Kroll and Stewart (1994) (Figure 1).

Figure 1

The Revised Hierarchical Model by Kroll and Stewart (1994)

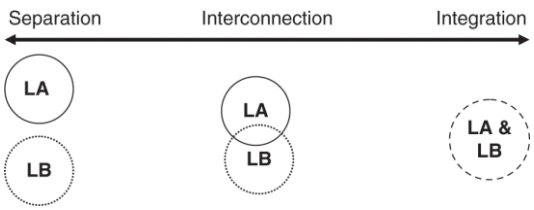


It is based on the two-lexicon hypothesis, and it combines the word association model and the concept mediation model proposed by Potter et. al. (1984). In short, it states that at the beginning, the L1 is strongly connected to the concepts and that the L2 depends on the L1. As the speaker's fluency grows, the L2 starts connecting to the concepts, and the L1 starts connecting to the L2. This model, however, explains only bilingual access, and it is still not known how it connects to multilinguals.

And lastly, Cook (2016) made an excellent point when writing about the connection of all the languages within the mind, saying that "the languages must be an inter-connected whole within a single mind, an eco-system of mutual interdependence" (p. 7). Within her concept of multilingual competence, she introduced an integration continuum model (Cook, 2003, 2016) (Figure 2).

Figure 2

The Integration Continuum Model by Cook (2003, 2016)



The model states that a person's languages can be completely separated, integrated, or somewhere in between. The two extremes are ideal and very unlikely to exist. Cook (2016) also explains that not all aspects of language have to be at the same point, some can be closer to the separation pole, while other can be closer to the integration pole.

3.3. Code-switching and related phenomena

In the following, a more precise definition of code-switching as well as other phenomena that are related, but not equal, to it will be given. It is important to clearly differentiate these terms for the purpose of theoretical and especially empirical studies.

Code-switching (CS) is an alteration of two or more languages (Herdina & Jessner, 2002). It occurs due to *language contact*, which is a phenomenon that develops when speakers of different languages interact, and that interaction causes the languages to influence each other (Aronin, 2022, p. 96). Language contact can also occur within the mind of a bi- or multilingual speaker, and that is when other phenomena, which are closely related to CS but still different, occur, such as: cross-linguistic influence, transfer, code-mixing, borrowing, code-crossing, and translanguaging, to name a few.

Cross-linguistic influence is the influence that priorly acquired languages have on the learning and usage of other languages (McManus, 2021). For example, when a Spanish native speaker pronounces English words as if they were Spanish or uses the same word order as in Spanish, e.g. 'the girl beautiful' instead of 'the beautiful girl' (James, 2012).

Transfer "is the influence resulting from similarities and differences between the target language and any other language that has been previously acquired*"* (Odlin, 1989, p. 27). Kootstra (2014) also mentions that transfer involves *covert* language interactions, while code-switching refers to the *overt* usage of various languages. Migge (2014), as an example of transfer, uses a conversation of young men in French Guiana who use both Sranantongo and Nengee: **"Da** i e waka **anga** futu ete, *jon brudu jon.* (Thus, you are still walking, man really)". This is seen as an instance of transfer because the speakers are not aware that they are using different languages because the two languages share some forms, they just assume that they are speaking one language.

Kamwangamalu (2010) differentiates ***code-mixing*** from code-switching, defining the former as switching between two or more languages within the same sentence (intrasentential) and the latter as switching between two or more languages within a speech situation (intersentential) (p. 116). An example of both phenomena is given by Gunturi (2021) of a speaker switching between and mixing English and Hindu (1a, 1b):

(1a) Code-mixing: *Main kal* movie *dekhne jaa rahi thi* and *raaste me* I met Sudha. (I was going for a movie yesterday and on the way, I met Sudha.)

(1b) Code-switching: I was going to a movie yesterday, *raaste men mujhe Sudha mil gayi.* (I was going for a movie yesterday; I met Sudha on the way.)

However, in this thesis, only the term code-switching will be used, referring to both intra- and intersentential situations.

Borrowing is the adoption and loan "of words, morphological forms, and grammatical patterns from another language" (Aronin, 2022, p. 96). Sakel (2005) further differentiates two types of borrowing: *matter* and *pattern* borrowing. *Matter borrowing* is "when morphological material and its phonological shape from one language is replicated in another language" (p. 15), while *pattern borrowing* "describes the case where only the patterns of the other language are replicated" (p.15). Aronin (2022) gives an example of Japanese loan words in many European languages, such as 'sushi', 'ninja', and Aboriginal words that were adopted in Australin English, such as 'kangaroo' and 'boomerang'. Sakel (2005), as an example of matter borrowing, gives the Moseten word 'ishkweera', which was borrowed from the Spanish word 'escuela', which means 'school'. Auer (2021) gives an example of pattern borrowing in Italian 'Nostra figlia fra un anno entra al collegio' (lit. our daughter in one year will go to boarding school) (p.161).

Code-crossing is similar to code-switching, but the difference is that the speakers doing the switching are using linguistic traits of a group that they are not accepted members of (Rampton, 1995). An example given by Rampton (1998) in his study of a neighborhood in the South Midlands is of a boy of Anglo descent using a Panjabi word when singing to his friend who is of Anglo/African-Caribbean descent.

And lastly, ***translanguaging*** is the strategic use of one's full language abilities, moving fluidly between languages and "going beyond the boundaries of languages" (Aronin, 2022, p. 164). Najarro (2023) gives an example of a multilingual classroom where students are given a problem in English, and to solve it, they use their native languages to facilitate and better understand what it is and what it is asking of them.

In the second half of the nineteenth century until the middle of the twentieth century, code-switching was seen as a weakness, used only by speakers who lacked sufficient knowledge in one language, thus, they would switch to a language they had higher proficiency in (Aronin, 2022, p. 165). Nowadays, code-switching is accepted as a common practice among multilingual speakers (Aronin, 2022). Poplack (1980), in her study of code-switching in

Puerto Rican bilingual Spanish-English speakers, concludes that code-switching requires more competence than was thought before, emphasizing that

> it is also striking that precisely those switch types which have traditionally been considered most deviant by investigators and educators, those which occur within a single sentence, are the ones which require the most skill. They tend to be produced by the 'true' bilinguals in the sample (…) Code-switching, then, rather than representing deviant behavior, is actually a suggestive indicator of degree of bilingual competence. (pp. 615-616)

Kroff et al. (2023) also add that bilinguals (and hence multilinguals) are aware of the situations they can code-switch in and the people they can code-switch with (p. 441). However, it also needs to be addressed that code-switching can happen as a result of a lack of knowledge and proficiency in a language, but it must not be seen as a 'bad' feature but rather as a coping and learning strategy.

A question that often arises in the literature is why and when code-switching occurs. Kamwangamalu (2010) mentions that it occurs to identify with a certain group, to express unanimity within a group, to exclude someone from a group, to emphasize something previously said, etc. Furthermore, Kroff et al. (2023) add that code-switching is a speech act supported by context (p. 442), and Poplack (1980), within her study, established that code-switching is indeed a norm in stable bilingual communities (p. 588).

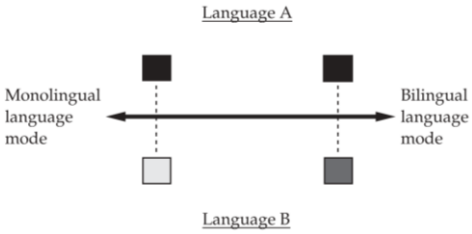
Myers-Scotton (1993a, b), who is a very influential author in the theoretical study of code-switching, developed two models, The Matrix Frame Model and The Markedness Model. The models delve into the social motivations for code-switching in bilingual speech production (see Myers-Scotton, 1993a, b; Myers-Scotton & Jake, 2009; Amuzu, 2010 for further explanations).

Clyne (1967, 2003) proposed a *triggering hypothesis* that states that *cognates* – words in different languages with a similar form and the same meaning – can trigger code-switching. Broersma and De Bot (2006) statistically tested this hypothesis on data from a Dutch and Moroccan-Arabic corpus. They found that it is certainly more probable for code-switching to occur after a cognate, but adjusted the hypothesis by stating that cognates do not necessarily predict code-switching, but rather predict a greater chance of its occurrence. Moreover, Grosjean (1989, 1995, 2012a, b) proposed a notion of *language modes* (Figure 3) which bilinguals (and hence multilinguals) can find themselves in. If they are interacting with an interlocutor who does not speak the same languages, they are in the *monolingual mode*, and

they try to disactivate their other languages as best as possible. If, however, the interlocutor does share a language with them, they are in a *bilingual mode*, and they tend to code-switch and borrow. In the bilingual mode, the two languages are active, but to a different extent (Grosjean, 2012a). However, not every bi-/multilingual speaker is the same, which entails that it is possible to 'travel' along the continuum.

Figure 3

The Language-Mode Continuum by Grosjean (2012b)



Code-switching can be *intentional* or *non-intentional*. Williams and Hammarberg (2005) name three factors due to which intentional code-switching occurs: *sociopsychologically motivated switches*, which indicate information about the attitude of the speaker and the context, *proficiency-related factors*, which refer to code-switching being used as a communication strategy when the speaker lacks sufficient knowledge and *metalinguistic comments*, when the speaker switches to comment on the communicative situation (pp. 3-4). They also mention *non-intentional language switches* mentioned by Poulisse and Bongaerts (1994), which the speaker is not aware of producing. Moreover, Kamwangamalu (2010) mentions Gumperz's interactional approach and his distinction between *situational code-switching*, which concerns "the social factors that trigger CS, such as the participants, the topic, and the setting" (Kamwangamalu, 2010, p. 123) and *metaphorical code-switching*, which concerns language factors, such as proficiency in a language. These factors influence the language choice.

It can be concluded that code-switching is a very frequent and typical phenomenon in bi- and multilingual production. It can occur both intentionally and unintentionally in different contexts, and it can be triggered by different topics and interlocutors.

4. Criteria for analyzing the models of multilingual competence

Since multilingualism is a complex area, there are many requirements that need to be accounted for when creating models of multilingualism. Not every multilingual person is the same, their prior language knowledge, environment, communicative needs, etc. are just some of the multitude of requirements that need to be considered when developing a model of

multilingualism. However, as previously mentioned, the models analyzed in this thesis are focused on properties of multilingualism shared by a number or a majority of individuals, and hence only this dimension of multilingualism will be taken into account. Since this thesis deals with an analysis of different models of multilingualism, some criteria for their evaluation will be suggested below.

4.1. The role and properties of code-switching

As expected, code-switching, its role, and its properties will be the first criterion for analyzing the chosen models of multilingual competence. It is a highly occurring phenomenon among bi- and multilingual speakers and language learners, it complements communication, helps express meaning better, and makes it 'fuller' because the speakers are using all available resources (i.e. their languages), it can show skill or lack thereof, etc. Within this thesis, it is considered a very important aspect that should be accounted for in models of multilingual competence.

In the beginning, it will be important to determine if code-switching is indeed included in the model. If it is not included, questions such as why it is not included and whether it can be regarded as an indispensable part of it will be further discussed and answered. If deemed necessary, it will try to be incorporated into the model.

If, on the other hand, it is included, then it will be further explained how the authors of the model define it. Furthermore, it will be explained how often it occurs, what the authors state about why speakers code-switch, how relevant it is for the model, and lastly, which properties and aspects of code-switching the respective model takes into account and how it represents them.

4.2. The focus of the model

Since multilingualism is a very complex and varied notion, it encompasses many different scopes and phenomena. Hence, there are many aspects that need to be considered when building a model of multilingual competence. For example, the learner's previous language knowledge and the role it might (not) play in the acquisition, processing, and production of a new one, as well as the influence of these other languages, of the interlocutors, of the situation on these aspects, many differences and similarities between different languages, etc.

Hence, models can, among other aspects, focus on *multilingual production* – all the different processes that take place in the mind while producing multiple languages – on *multilingual processing* – how different languages get processed in the mind – on *multilingual*

development – how multilinguals develop their abilities over time – on *multilingual competence* – explaining the relationship between the languages in the mind – on explaining code-switching and other similar language phenomena, etc.

Moreover, it will be mentioned if the models' focus is solely on one aspect of multilingualism or just on one. Likewise, if it really is necessary to mention all aspects of multilingualism within the chosen model. Lastly, it will be analyzed how relevant and important code-switching is to the model based on what it focuses on.

4.3. The view of psycholinguistic aspects of multilingual competence

As was already mentioned in the literature review, many authors mention different psycholinguistic aspects of multilingual competence and ask diverse questions regarding those aspects. The models in this thesis will be analyzed based on a distinct view of these aspects. For example,

1. How does the model explain language processing in multilinguals?
   Can the languages be disactivated, or are they always active? If they are always active, is it to the same extent?
2. Are the multilinguals' languages kept in a separate or an integrated lexicon?
   How many systems are there? Is there only one system for all languages or a separate system for every language?
3. How does the model explain multilingual language production?

5. Analysis of the models of multilingual competence

As was previously mentioned, three psycholinguistic models of multilingual competence were chosen to be analyzed in this thesis. They are as follows: *The language switches model* (Williams & Hammarberg, 2005), *The multilingual processing model* (Meißner, 2004), and *The dynamic model of multilingualism* (Herdina & Jessner, 2002). Specifically these models were chosen because they are psycholinguistic models and they focus on explaining relevant aspects of individual multilingualism. Firstly, each model will be described separately, and then their differences and similarities will be reviewed. After that, the models will be evaluated using the criteria set in the previous chapter and, if deemed necessary, will be complemented with the criteria.

5.1. The language switches model

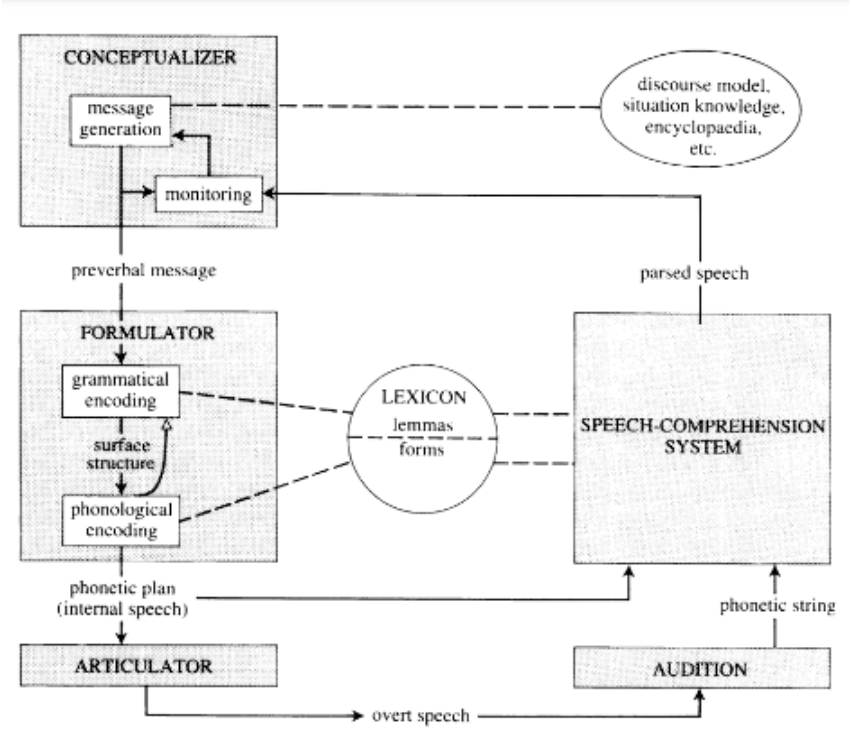
The language switches model (LSM) is a developmental model of speech production introduced by Sarah Williams and Björn Hammarberg in 2005. It is an extension of Levelt's 'speaking' model (Levelt, 1989) and De Bot's (1992) adaptation of it for bilingual production. Levelt's 'speaking' model (Figure 4) is a monolingual speech production model that states that speech production happens through a series of stages with different aspects occurring on each level. There are three main processing components: *the conceptualizer, the formulator,* and *the articulator*.

In *the conceptualizer,* a preverbal message is framed based on the speaker's intention, or, in other words, the speaker decides on the meaning that they want to express. In *the formulator*, the linguistic message is formed, and it transforms into linguistic representations. There are two important components here: *grammatical* and *phonological encoding*. *Grammatical encoding* is concerned with finding words and putting them together, while *phonological encoding* finds sounds and puts them together. At the end, there is a lexical message that the speaker whishes to express. And lastly, in *the articulator,* the lexical message is realized in overt speech.

During this whole modular process, the speech is being monitored via the *comprehension system*. It detects errors and stops them from being produced in overt speech.

Figure 4

Levelt's 'Speaking' Model (Levelt, 1989)



De Bot (1992) made some extensions and introduced a few changes to Levelt's model to make it apt for bilingual production.

In *the conceptualizer*, it is taken into account that different concepts are lexicalized differently in different languages (example: Spanish has 'aquí, ahí, allí' and English has 'here and there' (De Bot, 1992, p. 8)) and hence are accounted for in the conceptualizer, so that the speaker can differentiate them early on.

For *the formulator,* it is argued that it has different processing components (i.e. separate systems) for each language, which produce different speech plans, which account for some variations that exist across languages. The topic of an integrated or separate lexicon is also touched upon, stating that there is only one lexicon with different subsets. Which information will go into which subset depends on the linguistic distance of the languages and the speaker's proficiency in them.

De Bot takes an idea from Green's (1986) *inhibitory model,* emphasizing that a bi-/multilingual's languages can have three states: *selected, active,* or *dormant*. *The selected language* is the one controlling speech output and the only one going into the articulator. *The active language* is, evidently, active and is playing a role in the ongoing process, but is not proceeding into the articulator. *The dormant language* is residing in the long-term memory but does not have any effects on the ongoing process. Preverbal messages in the conceptualizer and the speech plans in the formulator are formed in parallel, but as already mentioned, only the speech plan of the selected language goes into the articulator. Thus, the choice of the language that is going to be used happens in the formulator.

And finally, in *the articulator,* it is suggested that bilingual individuals have a shared store for syllables of the two languages. If the patterns are identical in both languages, they are stored only once, and if there are no matching patterns, they are stored individually.

Williams and Hammarberg (2005) extended Levelt's 'speaking' model (Levelt, 1989) and De Bot's (De Bot, 1992) bilingual adaptation of it. They did a study on the influence of the L2 ("any previously learned languages" p. 3) on the acquisition of the L3 ("the language currently being acquired" p. 3), given that most of the literature to date has dealt with the influence of the L1 ("learner's native language" p. 3) on the L3. They proposed the notion of *'assigning roles'* to different languages known to the speaker to account for non-adapted language switches.

In their model, Williams and Hammarberg agree with Green (1986) that languages can be selected, activated, or dormant, but emphasize the fact that the activated languages are not

necessarily activated to the same degree. That is why they attribute different functions and roles to different languages. A ***supplier language*** is the language that supplies material for word construction, and an ***instrumental language*** is the one that serves to ease communication with metalinguistic comments. If one language is the main source of word construction, it is called the ***default supplier***. Williams and Hammarberg propose that the role of the default supplier results from four factors: *proficiency, typology, recency of use, and L2 status*. Once a language obtains that role, most of the crosslinguistic influence comes from it because it is the only one activated in parallel to the L3. It is used for forming most of the lexical constructions in the interlanguage until the proficiency in the L3 is high enough for it to become the default supplier. *The instrumental role* comes from the speaker's connection to a specific language, from the interlocutor's perception of the speaker with a particular language, and it is modified by the speaker's awareness of the languages that are known to the interlocutor.

Regarding the lexicon, Williams and Hammarberg adopt the idea of a shared lexicon with language tags, along with role assignment at a higher level of production. The role assignment is essential because it helps to explain non-intentional language switches, because the language that has the default supplier role is activated to a greater extent compared to the other supplier languages.

5.2. The multilingual processing model

The multilingual processing model (MPM), introduced by Franz-Joseph Meißner in 2004, is a model focused on intercomprehensive language processing. *Intercomprehension* is the capability to comprehend a language not previously learned (see Ilina, 2023; Meißner, 2008; Dzik, 2020 for further explanations). The model came to life due to empirical research done by Meißner and Burk in 2001 on plurilingual adults whose L1 was German and some of whom had prior knowledge of at least one romance language. They gathered the data by giving the adults texts in romance languages they had not previously learned. The research confirmed that adults with previous knowledge of one romance language outdid the adults who only knew English and German, because the former referred to their previous knowledge when decoding the target language.

There are three steps of the model (Figure 5):

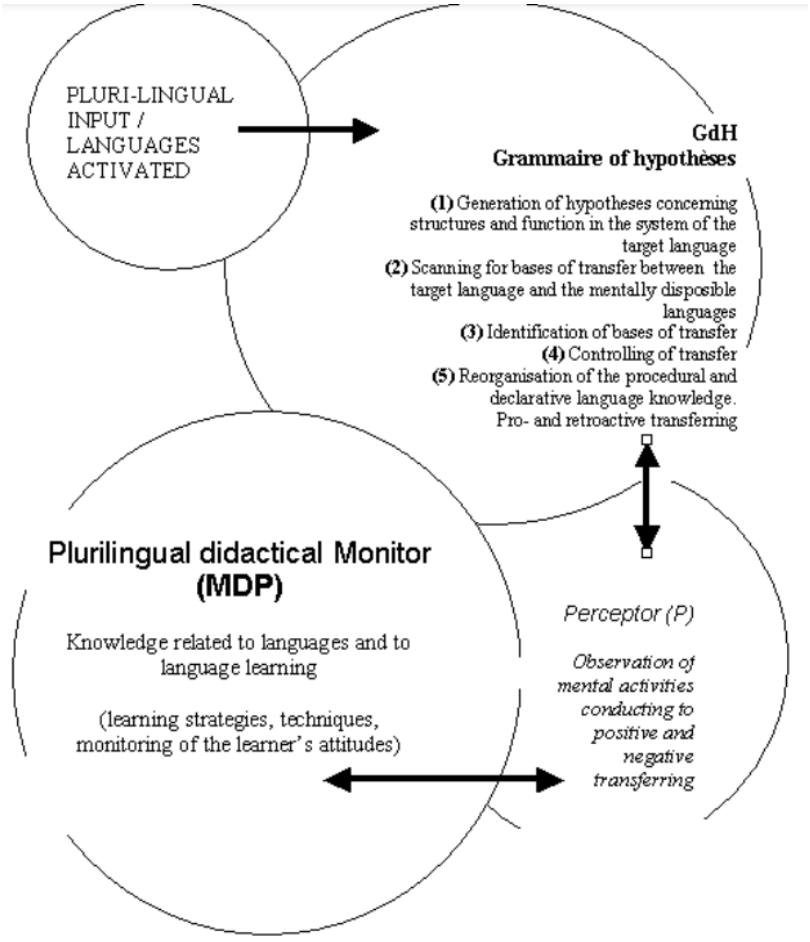
- The first one is the *creation of a spontaneous grammar* of the target language. It is based on the knowledge of previously acquired languages and on the "procedural ability to understand the unfamiliar target language" (p. 46). Normally, there is one

bridge language, although there can be more, that the learner depends on for easier acquisition. The learner "transfers knowledge, skills, and strategies" (Aronin, 2022, p. 198) from the bridge language(s) to complement the spontaneous grammar, which is dynamic and constantly changing.

- As proficiency grows, the learner starts developing a *plurilingual intersystem* that contains information about the grammar, the rules of the target language, etc., but also instances of negative correlations between languages. This intersystem serves the learner for better interpretation and understanding of the target language (Aronin, 2022, pp. 198-199).
- The third and final step is the creation of a *didactical strategic memory*. This is the place where the learner stores their experiences with language learning and acquisition, their strategies, and their techniques.

Figure 5

Three Steps of The Multilingual Processing Model (Meißner, 2004)



This model largely explains the processing of intercomprehensive languages, or, in other words, closely related languages or languages from the same families. Also, since the acquisition of the target language in some way depends on the bridge language(s), it is inferred that the learner has to have a higher proficiency in it/them. However, Meißner (2008) gives an example of how it is possible to understand the central message of a text in Polish, even though one does not know any Slavic languages. Moreover, Ilina (2023), in her study on plurilingual Italian-speaking adults, looks into whether intercomprehension can be used to autonomously decode the Cyrillic alphabet of Russian, even though none of the participants knew Russian or the Cyrillic alphabet. With that study, Ilina proved that the intercomprehension approach can be used for all European languages, not just closely related ones.

5.3. The dynamic model of multilingualism

The dynamic model of multilingualism (DMM) by Philip Herdina and Ulrike Jessner proposed in 2002 is a psycholinguistic dynamic model of multilingual language development. It is based on the *dynamic system theory*, which defines a dynamic system as "a set of variables that mutually affect each other's changes over time" (van Geert, 1994, p. 50). Hence, the focus is not on individual languages, but rather on the development of language systems that are a part of a speaker of multiple languages The presence of these language systems influences the development of the overall system and of all the subsequent language systems acquired. It views the overall multilingual system as a whole, and it tries to "provide an explanatory framework for threshold phenomena observed in multilingual speakers" (Herdina & Jessner, 2002, p. 111). An interesting aspect of the DMM is the statement that "the development of the multilingual system is determined by the speaker's perception of his/her communicative needs" (p. 135). Or, in other words, one is as proficient as their communicative needs require them to be.

The main characteristics of the model are: *non-linearity, reversibility, stability, interdependence, complexity,* and *change of quality* (p. 89). The progress of language acquisition is constantly varying, it does not progress in order, it is instead a non-linear dynamic process "with phases of accelerated growth and retardation" (p. 91). The progress grows or falls depending on the learner's resources – time and energy spent on acquisition and maintenance. If a learner does not spend enough time and energy maintaining their languages, the progress will reverse, or, in other words, language loss will occur. Thus, the stability of the overall multilingual system depends on the requirements of language maintenance. The

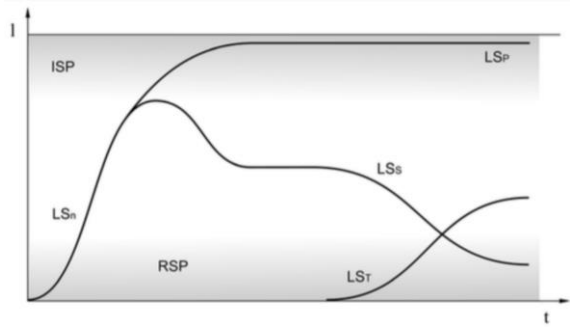
language systems within the multilingual systems depend on each other, that is, they are influenced by the preceding and consecutive systems. They are also complex in the sense that similar or even identical phenomena of transfer produced by the same speaker can have different properties within different language systems. And lastly, all these language systems can cause a change of quality in the overall multilingual system, which in turn can induce the development of new skills.

There are two key factors within the DMM that need to be discussed. The first factor is *language maintenance effort*, which is an essential factor in individual multilingualism. It depends on language use and language awareness. Marx and Hufeisen (2003) further explain that "the more a language is used, the more it is maintained; and the more aware an individual is of her increasing deficiency in a particular language, the more likely she may invest effort in attempting to maintain the language" (p. 189). Consequently, if the languages are not maintained, gradual language loss will occur. The second factor is the *multilingualism factor* (M-factor), which refers to "properties specific to multilingual systems" (p. 129). This factor indicates the difference between multilingual and monolingual language systems. Multilinguals develop properties that monolinguals do not have, they develop different skills to acquire, manage, and maintain their languages; all these skills contribute to metalinguistic awareness. They also develop an *enhanced multilingual monitor*, which represents their cognitive mechanisms that allow them to navigate their own language systems and to adapt to different linguistic situations.

In Figure 6, the overall development of multilingualism is demonstrated. The effect of prior language knowledge on additional language acquisition is focused on.

Figure 6

Learner Multilingualism: Overall Development (Herdina & Jessner, 2002, P. 124)



Note. LS_n = prior language system(s), LS_p = primary language system; LS_s = secondary language system, LS_t = tertiary language system, ISP = ideal native speaker proficiency, RSP = rudimentary speaker proficiency, t = time, l = language level

5.4. Evaluation of the models of multilingual competence according to the criteria

In the following each model will be evaluated with the previously established criteria.

5.4.1. Evaluation of *The language switches model*

The language switches model (Williams & Hammarberg, 2005) is a developmental model explaining language production. Firstly, it was developed to account for code-switching in multilingual language production, which fulfills the first established criterion. It is not specifically defined, but throughout the research paper, it can be understood as switching between different languages. It is a very relevant phenomenon in the current model, and its occurrence is explained in the previous version of the model adapted by De Bot (De Bot, 1992). De Bot agrees with Green's inhibitory control model (Green, 1986) and the notion of parallel activation (p. 13). Since all active languages activate in the conceptualizer and travel to the formulator, if code-switching occurs, then the speech plans of a non-target language, instead of the ones from the target language, travel to the articulator.

Williams and Hammarberg built on this notion by introducing role assignment (p. 15), which explains why some languages are more prone to be used for code-switching. They also introduce four primary types of code-switches (or, as they call them: non-adapted language switches): EDIT (used for self-repair), META (used for metalinguistic comments or to ask for help), INSERT (used to overcome lexical problems in L3 and when the speaker has high proficiency), and WIPP (the ones without an identified pragmatic purpose). By identifying these four categories, they account for all aspects of code-switching mentioned in this thesis: sociopsychologically motivated switches (situational code-switching by Gumperz), which would be the INSERT type; proficiency-related factors (metaphorical code-switching by Gumperz), which would be the EDIT type; metalinguistic comments, which would be the META type; and non-intentional code-switching, which would be the WIPP type. Looking at the frequency of code-switching within their study, Williams and Hammarberg concluded that code-switching occurred more often at the beginning of language acquisition, when the learner was less proficient. With time, the code-switches started decreasing, however, the INSERT and WIPP categories still occurred even when the proficiency increased.

Secondly, the model focuses primarily on language production. It does not account for other aspects of individual multilingualism. The model adequately takes into account code-switching since, apart from focusing on language production, it was developed to account for different types of code-switching during production.

And lastly, regarding the third criterion, taking into account Green's inhibitory control model (Green, 1986), Williams and Hammarberg state that all languages in the multilinguals' mind are active with different levels of activation (pp. 14-15). They also touch upon the notion of an integrated or separate lexicon, stating that there is only one, integrated, lexicon with language tags. Connected to that, they assume that there exist separate systems for different languages in a multilingual mind. Finally, the model does not touch upon language processing since it was developed to account for language production. But regarding production, it mentions three components: the conceptualizer, the formulator, and the articulator, with different aspects occurring on each level.

5.4.2. Evaluation of *The multilingual processing model*

The multilingual processing model (Meißner, 2004) is a model developed to account for intercomprehensive language processing in multilinguals. Initially, it does not mention code-switching because it largely focuses on transfer. Transfer is an important aspect of the model because, according to it, a learner can understand unknown languages because they transfer knowledge from previously known languages to the target language. As proficiency grows and a plurilingual intersystem starts to develop, both positive and negative instances of transfer are stored in it. Code-switching is probably not included in the model due to it being concerned largely with language production and less with language processing. On the other hand, if code-switching were to be included in the model, it could be assumed that in the early stages of acquisition, when the learner transfers knowledge from the bridge language(s) to complement the spontaneous grammar, apart from transferring, the learner can code-switch due to e.g. proficiency-related factors or to comment on communication. Then, proficiency-related code-switching (= metaphorical code-switching) and metalinguistic comments would be accounted for. Even in the later stages, code-switching could occur depending on the communicative situation, and then sociopsychologically motivated switching (= situational code-switching) would be taken into account. However, for the current model, that would not be necessarily relevant since code-switching involves language production and this model focuses on language processing. An aspect of code-switching that the model should include instead is how code-switched sentences are processed and how they influence the development of a plurilingual intersystem. However, complementing the model with that aspect falls out of scope of this thesis.

Regarding the second established criterion, this model only focuses on language processing. It does not deal with other aspects of multilingual competence. In general terms, a model

dealing with language processing should include code-switching as an important aspect of the model. However, the MPM does not take it into account, and hence, within the model, it is not adequately represented.

Lastly, since the model was developed to explain language processing in multilinguals, it mentions three steps that concern it: the creation of spontaneous grammar, the development of a plurilingual intersystem, and the creation of a didactical strategic memory. The model does not mention language (dis)activation per se, but since it does mention the existence of a bridge language, it can be assumed that the languages the learner knows are always active, although probably to a different extent. Then, when language processing takes place, possibly languages that are typologically similar are activated to a greater extent. And finally, the model states that there is only one, integrated, lexicon. It does not state anything about the number of systems in the mind nor about the production process of the multilinguals' languages.

5.4.3. Evaluation of *The dynamic model of multilingualism*

The last model evaluated in this thesis is *The dynamic model of multilingualism* (Herdina & Jessner, 2002), which overviews language development over time and focuses on language maintenance and language loss. To start with the first established criterion, the model does mention code-switching, but as part of an umbrella term called *crosslinguistic interaction*, which includes all transfer phenomena such as transfer, code-switching, borrowing, etc. It states that all transfer phenomena are a very important part of the development of a multilingual language system and that they should be "viewed and investigated as a single factor" (p. 19). Code-switching, as it is, is mentioned in some parts of the paper, and there it is defined as alteration between different languages. The model mentions an enhanced multilingual monitor which exists in multilinguals, which helps regulate language production and comprehension. That monitor plays a role in code-switching because it helps the speaker adapt to different linguistic situations. It can operate on a conscious or an automatic level, which would account for different types of code-switching. For example, if a speaker is adapting to different communicative situations with the help of the enhanced monitor, then sociopsychologically motivated switching (= situational code-switching) and metalinguistic comments would be accounted for. On the other hand, if the speaker switches codes due to a lack of knowledge or language loss, proficiency-related code-switching (= metaphorical code-switching) would be accounted for.

Secondly, the same as the other two models, this model focuses only on one aspect of multilingualism, which is the development of the overall multilingual language system over time. Taking into account the model's focus, even though code-switching is not put in the foreground, the parts where it is mentioned adequately represent its role and importance.

Lastly, within the dynamic model of multilingualism, the language systems that exist in a multilingual mind are seen as dynamic and constantly interacting with one another. That also makes the processes of language production and processing dynamic. Hence, it is unlikely that language systems can be disactivated. It is more probable that they are active to a different extent, depending on the communicative needs and language maintenance. The notion of a separate or an integrated lexicon is not accounted for in the model, but seeing as the language systems are constantly interacting with one another, it is likely that there is only one lexicon. On the other hand, the model emphasizes the existence of language systems, which are separate for different languages, and it places much importance on how those language systems form one overall multilingual system.

5.5. Differences and similarities between the models of multilingual competence

All three models of multilingual competence analyzed in this thesis are psycholinguistic models that focus on the individual and on different aspects connected to individual multilingualism. They all try to explain the interaction of languages in the mind.

While the LSM and the DMM take into account code-switching, the MPM lacks that aspect and rather puts its focus on transfer. The LSM and DMM include different aspects of code-switching in their own way, and within each model, those aspects are represented adequately.

Only the LSM directly mentions and agrees with Green's inhibitory control model (Green, 1986) and the notion of language activation. The MPM does not mention that aspect, but since it mentions the existence of a 'bridge language', which is similar to the 'default supplier' in the LSM, it can be assumed that Green's notion of parallel activation of languages would serve the MPM. Both the LSM and the MPM also explicitly mention the existence of an integrated lexicon. The DMM, on the other hand, mentions language activation in general as a part of language maintenance and language loss. It does not, however, state anything about the lexicon, but in the analysis, it was assumed that within the model, the integrated lexicon would make the most sense.

Looking at the more general picture, all of these models focus only on one aspect of multilingual competence, which is: production, processing, and development. That does not make them invalid or insufficient, because it is not necessary that every model takes

everything into account. That would make the theoretical study of multilingualism less varied and less detailed. However, there are some aspects that every model explaining multilingual competence should include, which are, for example: code-switching, the notion of the (dis)activation of languages, where and how the languages are stored in the mind, etc. Still, looking at the present literature, if, for example, a model does not focus solely on code-switching, it cannot be expected of it to put special consideration on it since code-switching is not the model's central purpose.

On the other hand, code-switching still should be accounted for by the model, thus, if a model explains only language production, it should be able to describe how, why, how often, etc. code-switched sentences are produced. The LSM does represent that adequately because it takes into account all these aspects of code-switching. If, on the other hand, the model focuses only on language development, the role of code-switching in the development of an individual language system (but also of an overall multilingual language system) should be taken into account. The DMM also portrays it adequately. And lastly, a model illustrating solely language processing should explain how code-switched sentences are processed and how they influence the individual and overall multilingual language system. The MPM fails to include the phenomenon of code-switching, which does have a significant role in language processing. It does not make it an invalid model in any sense, because it does adequately represent the process of intercomprehensive language processing to an extent. Nonetheless, it should be expanded with the phenomenon of code-switching to be able to present a full process of multilingual language processing.

6. Conclusion

This thesis focused on analyzing three psycholinguistic models of multilingual competence. An emphasis was largely placed on the role and properties of code-switching in the chosen models. Through the analysis, it was observed that each model highlights different aspects of multilingual language acquisition. *The language switches model* (Williams & Hammarberg, 2005) concentrates on how multilinguals produce language, putting its focus on how and why code-switching occurs and is produced, *the multilingual processing model* (Meißner, 2004) focuses on how multilinguals process languages, especially languages within the same language family and *the dynamic model of multilingualism* (Herdina & Jessner, 2002) explains how an overall multilingual system develops and changes over time. All of the models, to a different extent, focus on the interaction of different languages within the mind.

The first goal of the thesis, which was to analyze the role and representation of code-switching in the chosen models, was successfully fulfilled. Two out of three models deal with code-switching, and within their model, they represent it adequately. Other goals, which concern the research questions about the storage of a multilingual's languages and the activation of them, were also answered in the analysis. All models, in their own way, take into account language activation. Two models also mention language storage, opting for an integrated lexicon. All the findings of the analysis of the chosen models, apart from the ones now mentioned, are included in Table 1.

Looking into the existing literature concerning models of multilingual competence, in this thesis two works that provide an overview of models were mentioned, Aronin (2022) and Marx and Hufeisen (2003). Aronin (2022) mentions and briefly explains different existing models specifically dedicated to multilingualism, not focusing on any aspects of it in particular. Marx and Hufeisen (2003), on the other hand, analyze three models of multilingual competence in the context of multilingual education. Marx and Hufeisen (2004) also published a review article overviewing research on TLA and multilingualism specifically published in German, where some models of multilingual competence were generally discussed.

This thesis, therefore, contributes to the theoretical study of multilingualism and multilingual competence by providing an overview of strictly psycholinguistic models of multilingual competence and by putting its focus on the inclusion and representation of code-switching in the respective models. It also might serve as a contribution to future research on the general role of code-switching in multilingual language acquisition, as well as an aid for a greater inclusion of code-switching in existing models of multilingual competence. Likewise, it could serve as a starting point for a possible development of a uniform model of all aspects and phenomena included in multilingual competence or, on the other hand, of a model that takes into account all types of crosslinguistic interaction connected to multilingual language acquisition. Furthermore, future studies on the topic of the inclusion of code-switching in psycholinguistic models of multilingual competence could include a different variety of models to obtain a broader picture of the theoretical study of the topic. Likewise, the overviewed models could attempt to be tested to gain more empirical data concerning code-switching in the models, which in turn would serve to gain even more profound knowledge of the importance of the inclusion of CS.

As has been demonstrated, code-switching is a highly occurring and very important phenomenon in multilingualism, and it should be more accounted for in models of

multilingual competence. On the same note, the models analyzed in this thesis contribute to the area of multilingualism because they all focus on different aspects of it, which makes them an excellent overview of the different aspects included in multilingual competence.

Table 1

Summarized findings of the analysis of the chosen models

CRITERION: **The role and properties of code-switching**			
	The language switches model	**The multilingual processing model**	**The dynamic model of multilingualism**
Is CS included?	Yes	No	Yes
How is CS defined?	As switching between different languages	/	As alteration between different languages
How often does CS occur?	More at the beginning of acquisition	/	Does not specify
Why do speakers code-switch?	Intentionally for self-repair, for metalinguistic comments, due to lack of or high proficiency, unintentionally	/	To adapt to different communicative situations, due to lack of proficiency or language loss
Which aspects of CS are included?	Sociopsychologically motivated switches (=situational CS), proficiency-related switches (=metaphorical CS), metalinguistic comments, unintentional CS	/	Sociopsychologically motivated switches (=situational CS), proficiency-related switches (=metaphorical CS), metalinguistic comments
How relevant is CS to the model?	Very relevant	/	Seen as important, but not discussed to a greater extent
Is CS represented adequately?	Yes	No	Yes
Why is CS not included?	/	Because the model largely focuses on transfer	/
Should CS be included?	/	Yes	/
How to incorporate CS?	/	Explain how code-switched sentences are processed and how they influence the development of the plurilingual intersystem	/

CRITERION: **The focus of the model**			
	Language production	Intercomprehensive language processing	Language development
CRITERION: **The view of psycholinguistic aspects of multilingual competence**			
	The language switches model	**The multilingual processing model**	**The dynamic model of multilingualism**
How does the model explain language processing?	Does not specify	Three steps: the creation of a spontaneous grammar, the development of a plurilingual intersystem and the creation of a didactical strategic memory	It sees language processing as dynamic
Can languages be disactivated or are they always active? To what extent?	Languages are always active to a different extent	Languages are always active to a different extent	Languages are always active to a different extent
Are languages kept in a separate or integrated lexicon?	Integrated lexicon	Integrated lexicon	Integrated lexicon
How many systems are there?	Separate systems for different languages	Does not specify	Separate systems for different languages that form one overall multilingual system
How does the model explain language production?	Three processing components: the conceptualizer, the formulator and the articulator	Does not specify	It sees language production as dynamic

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