Language Maintenance in Polyglots from a Dynamic Model of Multilingualism Perspective: Research Results

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Abstract. This paper aims at shedding light on two under-researched study fields: polyglotism and language maintenance in multilinguals from a psycholinguistic perspective. The theoretic lens for the latter is the holistic and Complex Dynamic System Theory perspective of the Dynamic Model of Multilingualism by Herdina & Jessner (2002). The issue of terminology around the terms *multilingual, polyglot,* and *hyperpolyglot* is outlined and a new definition for the term *polyglot* is offered. Terms like *language lover* and *language enthusiast* are also considered. A selection of the findings of the author's doctoral thesis (2020) is presented. Data was gathered from participants in two international polyglot events in 2016 and 2017 with the help of a questionnaire and a semi-structured expert interview. Eighteen polyglots were questioned. Among them were renowned polyglots like Richard Simcott, Alexander Argüelles, Helen Abadzi, Luca Lampariello, and Elisa Polese. Voice is given to the participants of this study in the form of excerpts from the interviews. Ample proof that considerable language maintenance effort is necessary to counteract the phenomenon of language attrition if not enough time and energy are invested in the multilingual psycholinguistic system was found. The perceived importance that polyglots attach to language maintenance is described. An emergent property, namely smart strategy orchestration of language acquisition, language maintenance, and language management strategies, was identified in experienced language learners such as polyglots. For the first time, language maintenance strategies were classified. These are the strategies that aim to maximize language use and to minimize the language maintenance effort. Affective, metacognitive, and psychological factors were found to play a significant role in language maintenance. The focus was laid on the love for languages and on motivation as the most impactful factors.

Keywords: polyglots, polyglottery, language maintenance, language maintenance effort, language maintenance strategies, Dynamic Model of Multilingualism, multilingual awareness, international polyglot events

Поддержание языка у полиглотов с точки зрения динамической модели многоязычия: результаты исследования

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Аннотация. Цель данной статьи заключается в том, чтобы пролить свет на две недостаточно изученные области исследований: полиглотизм и поддержание языка у мультилингвов с психолингвистической точки зрения. Теоретической основой при рассмотрении второй из этих тем является динамическая модель многоязычия Хердины и Йесснер (2002) в свете холистического подхода и теории сложных динамических систем. Обсуждается проблема употребления терминов «мультилингв», «полиглот» и «гиперполиглот» и предлагается новое определение термина «полиглот». Также рассматриваются такие термины, как «любитель языка» и «языковой энтузиаст». Вниманию представляются некоторые результаты диссертационного исследования автора (2020), данные для которого были собраны у участников двух международных полиглотических форумов 2016 и 2017 годов с помощью анкеты и полуструктурированного экспертного интервью. Было опрошено 18 полиглотов, среди которых такие известные полиглоты, как Р. Симкотт, А. Аргуэльес, Х. Абадзи, Л. Лампариелло и Э. Полезе. Приводятся примеры высказываний участников исследования в виде отрывков из интервью, а также иллюстрации того, что поддержание языка требует значительных усилий – как энергии, так и времени – со стороны обучающегося. Описывается воспринимаемая важность, которую полиглоты придают поддержанию языка. У опытных практиков изучения языков, каковыми являются полиглоты, было выявлено эмерджентное свойство, а именно эффективное оркестрирование стратегиями усвоения, поддержания и использования языка. Впервые были классифицированы стратегии поддержания языка: это стратегии, которые направлены на максимизацию использования языка и минимизацию усилий по поддержанию языка. Было обнаружено, что в поддержании языка важную роль играют эмоциональные, метакогнитивные и психологические факторы. Особое внимание было уделено любви к языкам и мотивации как наиболее влиятельным факторам.

Ключевые слова: полиглоты, полиглотия, поддержание языка, усилия по поддержанию языка, стратегии поддержания языка, динамическая модель многоязычия, многоязычная осведомленность, международные полиглотические форумы

1. Introduction

The present paper aims at exploring two under-researched study fields: language maintenance in multilinguals from a psycholinguistic perspective and polyglotism. It constitutes a novelty in multilingualism and polyglottery research as it investigates into language maintenance in experienced speakers of multiple languages with LS ≥ 6 to LS ≥ 50 and their endeavour to counter the phenomenon of language attrition. From the holistic perspective of the Dynamic Model of Multilingualism (DMM) [8] all the language systems that the participants had explored are considered. The perceived importance that multilinguals attach to language maintenance and the major issues they encounter on their language learning and maintenance path have been described for the first time. To the best of the author's knowledge, never before had characteristic features of polyglots been set in relation to language maintenance. Utmost attention is paid to the role of multilingual awareness both in language learning and language maintenance. Language maintenance strategies have been identified and classified for the first time and exemplified with numerous excerpts from the interview data. The *smart strategy orchestration* has been identified as an emergent property in experienced speakers of multiple languages, which has an *enhanced strategy effect* both on the learning and the maintenance of languages. This study also contrasts and discusses the terms *multilingual* and *polyglot* showing the difficulties of delineation of the terminology in various study fields and describes related terms such as *hyperpolyglot, language lover,* and *language enthusiast* collected in the qualitative data. A definition of the term *polyglot* is also offered.

2. Terminological issues

In academia, there is an ongoing debate around the terms *monolingual, bilingual, multilingual, polyglot,* and *hyperpolyglot.* The inconsistent use of these terms depends on the different backgrounds of the researchers and their study purposes in the various fields as well as on how languages are counted, on the non-categorical nature of language use and language proficiency. *Monolinguals* are generally defined as speakers who use one language and may also be proficient in using different varieties and registers of that language. Not always is the distinction between a language and a variety well-defined and the reasons for the distinction may be cultural or political [cf. 17, p. 14]. Some researchers of multilingualism even claim that being able to speak one language and different social registers, dialectal and standard variants should be considered in studies of multilingualism and that L1 learning can thus be viewed as multilingual learning [cf. 11, p. 111].

Definitions around the term *bilingual* are even more divergent. While in cognitive neuroscience, according to Reiterer [20, p. 155–156], the terminology has become uniform to facilitate interdisciplinary communication and has adopted the term *bilingualism* in studies which deal both with the learning and processing of two and more languages, researchers in other fields, according to Kemp [17, p. 15] do not adhere to a universal cover term. The distinction between a *bilingual* as a speaker of two languages and a *multilingual* as a speaker of three or more languages is not commonly shared. Scholars within the tradition of Second Language Acquisition (SLA) commonly use the cover term bilingualism for the acquisition of a second, third and additional languages since they assume that findings from the learning of two languages can be generalized to the learning of multiple languages. Researchers from the Third Language Acquisition (TLA) standpoint, however, claim that the learning of a third (L3) or of an additional language (Ln) both in a tutored and a natural setting is a more complex learning process than the learning of two languages. Kemp [ibid.] defines a *multilingual* as follows, mentioning the terms *polyglot* and *plurilingual* at the same time:

> "A multilingual is a person who has 'the ability to use three or more languages either separately or in various degrees of code-mixing. Different languages are used for different purposes, competence in each varying according to such factors as register, occupation, and education' […] Multilinguals may not have equal proficiency

in or control over all the languages they know. The term 'polyglot' is also sometimes used to describe multilingual individuals. The term 'plurilingual' is used by some researchers, including the Francophone tradition, to indicate individual as opposed to societal multilingualism".

Definitions of the terminology related to multilingualism depend on correlated disputes on the nature of languages, their boundaries, on language use, and on language proficiency. Scholars increasingly claim that languages cannot be seen as isolated units with clear boundaries, but rather that they are defined on the basis of linguistic, cultural, social, or political reasons. It has often been observed in psycholinguistics that the mental boundaries between languages and language varieties are seamless. "[M]ultilinguals may see related languages as effectively the same language" [ibid., p. 18]. Scholars like Canagarajah [3] assert that boundaries in multilingual speech production are fluid and multilingual speakers can make use of all their languages in their repertoire in a creative way. Dovchin & Lee [5, p. 106] posit that "the fluid movement between and across languages requires different epistemologies and a new critical lexicon". Kusters, Spotti, Swanwick, and Tapio [18, p. 220] have even "gradually moved to a more flexible and less structured field of multilingualism". In their article "Beyond languages, beyond modalities: transforming the study of semiotic repertoires" [7, p. 223], they also consider bi/multilingualism in sign languages. They therefore prefer to speak about semiotic rather than linguistic repertoires.

A non-consistent use can be observed also regarding the terms *multilingual* and *polyglot*. *Multilingual* is of Latin origin and stems from *multae linguae* which means "many tongues, many languages". *Polyglot* is of Old Greek origin and comes from the Attic form πολύγλωττος (polỳglōttos) "many-tongued, polyglot", from πολύς (polỳs) "many" and γλῶττα (glôtta) "tongue, language". Both terms make reference to speakers of multiple languages and to adjectives that refer to multiple languages. Hyltenstam [12, p. 215] affirms that in the past the term *polyglot* was used in psychological, medical, and in linguistic studies of aphasic patients, but that it has become obsolete in today's literature on bi/multilingualism, so that it can be freshly used for a specific type of speakers, which he identifies as "single individuals [who] acquire 10, 20, or even more languages and maintain their ability to use most of them over their lifespan". In another publication, Hyltenstam operates with the following definition: "A polyglot is a person who, after puberty, acquired/learnt at least six new languages, who commands at least six of these languages at an intermediate or advanced level of proficiency (minimally B1 in the Common European Framework of Reference (CEFR) and who can use them unimpededly in oral interaction" [13, p. 177]. In 2003, in a blog, Hudson coined the term *hyperpolyglot* for people "who can speak six or more languages fluently" [12, p. 215]. He had also defined hyperpolyglots as "people who know dozens of languages very well" [10, p. 90]. As an example he had chosen "the legendary Cardinal Giuseppe Mezzofanti [who] was said to be familiar with 72 languages and fluent in 39" [ibid.]. Hobbs [9, p. 35], however, mentions a definition of "hyper-polyglot" as a "speaker of six or more languages […]". The necessity of a further distinction between *polyglot* and *hyperpolyglot* is questioned by Hyltenstam [12, p. 215] since he believes that the word *polyglot* in itself already specifies the semantic elements that are necessary to describe a speaker of many languages. Alexander Argüelles in the interview for the doctoral study by the author of this paper also would not make a further distinction or pinpoint the definition to a number of languages learnt but rather distinguish between mastery levels. He said:

> "It would never occur to me to do that. Now that it has been done, people are doing that, if it is going to become a field of study, then, yeah, I can understand, you know, it does make sense. To me, I wouldn't think of it as being a super- or a super-duper hyperpolyglot or something, I would just think within being […], sort of, being a beginning polyglot, an intermediate or advanced polyglot, you know, sort of mastery levels" [19, p. 126, 329].

Other researchers do not make a distinction between *polyglot* and *multilingual*. Todeva and Cenoz [23, p. 18] defined them as follows: "The former is typically defined as a generic term for a multilingual person, not infrequently in reference to people with an impressive number or mastery of languages. […] We prefer the term multilingual because of its phonological closeness to multilingualism and more neutral nature with regard to level of proficiency and number of languages involved". In a blog run by the linguists

Grosjean and Pavlenko, the latter[1] criticizes the recent "polyglot hype" by the media. In her view, journalists, very often monolingual themselves, are only interested in exceptional language learners because their stories of learning languages "for pure love and against all odds" are more exciting than those of ordinary multilinguals and allow speculation about some mystical talent. She claims that distinguishing the terms would only make the complexity of language learning and the effort of mastering a language by many multilinguals look trivial.

Yet scholars like Kazakov and Argüelles clearly want to distinguish a *polyglot* from a *multilingual*. Kazakov differentiates "polyglots as individuals who know multiple languages as a result of consciously learning them, from multilinguals, those who can speak several languages thanks to having assimilated them unconsciously in a multilingual environment" [15, p. 135], see also [16, p. 8290]. Argüelles admits that the distinction between the two terms might not always be clear-cut. He defines a *polyglot* "as an expert language learner, someone who has mastered the science of learning languages. Unlike multilingual people who owe their knowledge and abilities in multiple languages to being born into and/or growing up in and/or receiving their education in multilingual environments, polyglots owe their linguistic knowledge and abilities to the conscious and deliberate study of foreign languages" [2, p. 1]. In the interview for the author's doctoral thesis he gives the following definition:

> "I don't think you can be a natural polyglot. A polyglot means to me that you can start, if you are naturally multilingual, you have an advantage to become a polyglot, but to me a polyglot is not just somebody who knows lots of languages, but somebody who has studied them, who has learned them. So they are not just languages that come from the environment, but they come from a conscious decision to say: 'I want to learn more languages. Maybe I want to know one or maybe I want to know six or I want to know a lot', but a polyglot is somebody who has multiplied his languages by sort of a conscious study, a conscious choice" [19, p. 126–125, 329].

New definition of *polyglot*

The author of this paper is also aware that there are some overlaps between the terms *multilingual* and *polyglot*, but after the analysis of the interview data and studies on polyglots, she is in favour of adopting in multilingualism research a distinctive term for the population explored in her dissertation and suggests the following definition: "A polyglot is an experienced, autonomous learner of many languages who is characterized by a life-long passion for language learning and an enhanced multilingual awareness. A high motivation, an open-minded attitude towards other languages and cultures, perseverance and self-discipline are characteristic features of a polyglot" [ibid., p. 301]. She does not deem a further distinction into *hyperpolyglot* important. Since speakers of an impressive number of languages like Cardinal Mezzofanti, Richard Simcott and Alexander Argüelles find it difficult or even impossible to count their languages [see ibid., p. 84–85, 188, 189], she does not pinpoint her definition to a number of languages, although she has identified in about six language systems the threshold after which the learning process becomes familiar. Her definition is only based on characteristic features of polyglots. For the Polyglot Conference Global 2023[2] and Polyglot Conference 2023[3] in Budapest, she had suggested a simpler definition: "A polyglot is a smart learner of many languages who is characterized by a life-long passion for language learning", but this definition misses out many distinctive character traits.

For the difficulty of counting one's languages, see the extract from the interview with Argüelles.

> "I am just not comfortable with numbers. […] To me it becomes so blurry […]. So I really think in terms of families. I would say that I know the Germanic family and the Romance family quite thoroughly. So there are languages like German first and foremost, and Old Norse as another language that I have invested years of my life in studying and improving and getting to quite a high level, and then coming along with them are all the

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[1] Pavlenko, A. The dark side of the recent polyglot hype: Was Cleopatra a multilingual or a polyglot? Psychology Today, 15 July 2015, psychologytoday.com/intl/blog/life-bilingual/201507/the-dark-side-the-recent-polyglot-hype (accessed 29 May 2024).

[2] Pellegrini, C. What polyglots teach us about language maintenance. Polyglot Conference Global 2023, 2023.polyglotconference.com/lecture/what-polyglots-can-teach-us-about-language-maintenance/ (accessed 29 May 2024).

[3] Pellegrini, C. Kató Lomb's musings on polyglots compared with findings from my doctoral thesis on polyglots. Polyglot Conference 2023 in Budapest, 27 October 2023.

other dialects, are all the other variants of them. And the same is true of the Romance family to a large degree, of the Slavic family to a lesser degree. So I feel comfortable saying I have really invested years of my life in getting familiar with these language families. […] [B]ut when I start counting the Germanic languages, it's just hard to do […] because I studied Old Norse, because I studied German, I found learning Swedish to be very easy […]. Because I know Swedish, Norwegian and Danish are so transparent and so easy to me that I can read them with no problem. And I have had experiences where I thought I was speaking Swedish to a Norwegian person and they complemented me on my Norwegian. So I had just been switching into that. It becomes really convoluted" [ibid., p. 193, 331–332].

Simcott also finds it difficult to count his languages and thinks in terms of language families.

"I don't tend to count them and if I do, I leave a few out. I've always said for a long time: 'I think it is around 40', but then actually [*unclear*] it is more around 50. [*unclear*] Because it is a lot. I have studied pretty much all of the Romance and all of the Slavic languages, all of the Germanic, which is already a lot, without going out of the Indo-European" [ibid., p. 194, 348].

These excerpts of cases with Ln > 40 show the fluidity of language systems within a psycholinguistic system and indicate that the concept of language repertoire may be revisited. It is certainly in line with the DMM, which conceptualizes languages as interdependent subsystems within a unitary system.

3. Language development in multilingual systems

Theoretical background

Herdina's and Jessner's Dynamic Model of Multilingualism [8] is the theoretical lens of the present study. This psycholinguistic model applies Complex Dynamic System Theory (CDST) to the exploration of multilingualism and multiple language acquisition. It was designed to model language-related process-es with multiple languages and to predict multilingual development. It focuses on so far neglected aspects such as language attrition, language maintenance, multilingual awareness, crosslinguistic influence and autocatalytic changes that may emerge in the multilingual mind. It does not focus on languages (L1, L2, Ln) but, rather, on the development of the individual language systems (LS_1, LS_2, LSn) within an overall psycholinguistic system. The different language systems are seen as a unity that is dynamic and adaptive and which changes continuously in a non-linear way. Being adaptive, the system responds to altered con-ditions in the environment. As an open system, the psycholinguistic system is shaped by psychological and social factors. The DMM posits that language use and language choice depend on the perceived com-municative needs of the multilingual speaker. An important role is attributed to language maintenance, which is responsible for the stability of the system. As a learner's resources of time and energy necessary for language acquisition and maintenance are limited, a multilingual speaker will gradually lose access to the linguistic knowledge in his/her language systems if not enough energy and time are invested into refreshing them. This will lead to language attrition, called *negative language growth* in the DMM. Lan-guage maintenance (henceforth LM) is consequently an adaptive process to adjust the level of language proficiency to the perceived communicative needs.

The DMM uses a holistic perspective to describe the dynamic interaction, the complexity, and varia-bility of a multilingual system [see also 14]. The *multilingualism factor* (or *M-factor*) is all those qualities that emerge in a multilingual learner/speaker due to the increased contact of his/her language systems. New skills related to language learning, maintenance and management are developed because of prior linguistic and metacognitive knowledge [4, p. 65]. One key component of the M-factor is *multilingual awareness,* which is composed of *metalinguistic awareness* and *crosslinguistic awareness* (XLA). XLA is the tacit or implicit awareness of the interaction of the languages in the multilingual mind. The second com-ponent of the M-factor is the *enhanced multilingual monitor* (EMM). It is responsible for the linguistic management skills, for balancing language resources with the communicative needs, for keeping the lan-guages in the multilingual mind apart or for choosing the appropriate languages and registers in specific sociolinguistic contexts.

Language attrition in multilingual systems

While traditional SLA language acquisition models assume a linear language growth towards an ideal native speaker competence, the DMM claims that this growth is not linear and that the process can even reverse, i.e. that linguistic knowledge will erode if not enough time and energy are invested. Negative growth will lead to language attrition or *gradual language loss.* This phenomenon is due to lack of LM. Other factors may also have an impact on language attrition. These are "the number of languages involved, the maturational age at which a certain language is learnt and relative stability established, the level of proficiency at which this takes place and the time span over which the language system is maintained" [8, p. 92]. From a CDST perspective, we can say that while one of the language systems within the overall psycholinguistic system is stabilized, another LS will only be insufficiently maintained and therefore undergo a gradual erosion process.

Language maintenance in multilingual systems

LM has so far been studied in sociolinguistics when "a speech community tries to continue to use its traditional language although threatened by language shift to the dominant language of the community" [ibid., p. 98]. However, it can also be noted when the language of speakers of a minority language is threatened by a dominant language environment [1, p. 72]. Within the field of psycholinguistics, this phenomenon is largely disregarded. The DMM, however, predicts that the multilingual individual must make an effort to adjust the language proficiency levels to the perceived communicative needs in order to stabilize the system. This effort is called *language maintenance effort* (LME). It is determined by two factors: 1)the language use factor, i.e. when in communication parts of the language systems are activated and so refreshed; 2) the language awareness factor, i.e. when implicit or explicit knowledge about linguistic subsystems is verified. According to the DMM, the amount of LME necessary to ensure homeostasis of the multilingual system is bound to increase with the accumulation of linguistic knowledge. The individual LME sets therefore a natural limit to the learner's language acquisition effort (LAE). This explanation is regardless of the learner's age and of the critical period hypothesis and could also explain why a linear progress in language learning is constantly hampered by LM. Multilingual speakers will therefore try to reduce LME, e.g. by developing domain-specific language skills. A relatively small decrease in the proficiency level of the single LS will lead to a disproportionally larger decrease in LM. To the knowledge of the author of this paper, this study is the first on LM from a holistic, psycholinguistic, and multilingual perspective.

4. Methodology and selection of participants

The author had read extensively websites, social networking sites, blogs, and watched YouTube videos in which polyglots share their language learning experience and their language learning techniques. On Facebook, she had learnt about the Polyglot Conference in Thessaloniki (Greece) in 2016, which she attended as an insider to get familiar with the setting and to recruit potential participants for her study. Additional participants were found at the Polyglot Gathering in Bratislava (Slovakia) in 2017. Both events are two large-scale international polyglot event series in which language enthusiasts from all over the world meet offline to attend talks and workshops on language-related topics.

For participant selection the author used a purposive sampling method. Participants (PAR) were individuals that she had met in person and that had LS ≥ 6 languages belonging to language families ≥ 3 in their repertoire. Extreme cases with LS > 20, 30 were also selected since it was assumed that the LME would be even more evident in those cases. PAR had aroused the author's attention in their conference talks or in informal conversations. They belonged to different age groups: n = 6 aged 20–30 (33%); n = 6 aged 31–40 (33%); n = 3 aged 41–50 (17%); n = 2 aged 51–60 (11%); n = 1 aged 61–70 (6%). Gender distribution was not even (m =14, f = 4) but had not been deemed as a priority criterion. Proficiency levels could not be assessed by the researcher but had to be gathered from a questionnaire. Out of eighteen

PAR, sixteen had consented to their names being used. Among them are the organizers of the Polyglot Conference (PC) and speakers at the PC and the Polyglot Gathering (PG) as well as polyglots who were simple participants at the events (see Table 1).

Participant	Surname	First name	Gender	Age group	Polyglot event
PAR 1	Abadzi	Helen	f	61–70	PC 2016
PAR 2	Samarelli	Francesco	m	31–40	PC 2016
PAR 3	Lampariello	Luca	m	31–40	PC 2016
PAR 4	Ponnoussamy	Christine	f	20–30	PC 2016
PAR 5	Argüelles	Alexander	m	51–60	PC 2016
PAR 6	De Leo	Angelo	m	20–30	PC 2016
PAR 7	Hedin	Simon	m	31–40	PG 2016
PAR 8	Rawlings	Alex	m	20–30	PC 2016
PAR 9	Simcott	Richard	m	31–40	PC 2016
PAR 10	Anon. 1		m	41–50	PC 2016
PAR 11	Batyrev	Ivan	m	20–30	PC 2016
PAR 12	Haunold	Jessie Ann	f	51–60	PG 2017
PAR 13	Ternon	Emmanuel	m	20–30	PG 2017
PAR 14	Dolgushin	Andrei	m	31–40	PC 2016
PAR 15	Sahir	Fiel	m	20–30	PG 2017
PAR 16	Anon. 2		m	41–50	PG 2017
PAR 17	Polychronopoulos	Dimitris	m	41–50	PG 2017
PAR 18	Polese	Elisa	f	31–40	PG 2017

Table 1. Participants, gender, age group, and polyglot event of contact

Research instruments were a questionnaire with questions on personal data, language biography, languages explored, language acquisition and maintenance experience, and self-rated proficiency in the languages actually maintained and a semi-structured expert interview. The interviews had an average length of 58:13 minutes and were completely transcribed by the author. One interview was conducted face-to-face, the other ones on Skype since the PAR were scattered all over the globe after the polyglot events. Since the collection of the qualitative data was conducted before the Covid pandemic, some participants were not familiar with recorded video calls and had some technical issues. A thematic analysis was conducted with MAXQDA, a software for qualitative data analysis that allowed "the voices of the participants emerge clearly" [21, p. 193]. Against the common practice to publish only short quotes from the interview, the author of this paper gave ample space to the citations since she is convinced that the multiple voices of these language experts deserve to be heard in academic research.

5. Analysis and some research results

Research question 1: Terminology

RQ 1: How do participants in polyglot events define a polyglot or a hyper(poly)glot? What distinguishes polyglots from multilinguals? Do participants in polyglot events use alternative terms to describe themselves?

The analysis of RQ 1 will not be discussed in detail. From the answers of the PAR a number of characteristic features of a polyglot were elicited. These were incorporated in the definition of a *polyglot* by the author (see "Terminological issues" above). There was no consensus on terminology among the interviewees. PAR 1 and 2 saw the terms *polyglot* and *multilingual* basically as synonyms. The majority of PAR, however, were convinced that a distinction between the terms should be made although they were aware of possible overlaps. PAR 3, 4, 6, 18 essentially shared what the three organizers of the PG had also mentioned: Rawlings believed that the love for languages and the interest in language learning may be distinctive features [19, p. 130]; Simcott said that polyglots learn languages that are seemingly unnecessary for them [ibid., p. 128, 350]; and Argüelles, who became a PC organizer in 2017 and 2018, underlined

the fact that polyglots learn languages as a result of a conscious choice [ibid., p. 126, 329]. PAR often mentioned that polyglots learn languages because of their love for languages, unlike multilinguals, who were perceived as acquiring languages in a multilingual environment or because of life circumstances. A recurrent theme in the analysis (42 codings) was the love for languages and the passion for language learning. It can therefore certainly be seen as the most distinctive feature of a polyglot.

A great uncertainty was found around the term *hyperpolyglot*. PAR 12 had never heard it before [ibid., p. 138]; others would not apply the term to themselves but only to PAR with an impressive number of LS like Simcott, Tim Keeley or Argüelles [ibid., p. 139–140]. Simcott and Argüelles would not use the term in relation to themselves, though. Simcott, who had been contacted by Hudson, said that Hudson's definition did in fact describe him since he speaks several languages at a very high level, yet the term *hyperpolyglot* is not important to him to live by [ibid., p. 129–139, 351].

While the majority of participants applied the term *polyglot* to themselves, three preferred not to be labelled at all (PAR 3, 7, 14). Other PAR preferred terms like *language lover* or *language enthusiast* since they were perceived as more neutral and less elitist and since they comprised the love for language learning. PAR 10 used both terms interchangeably and described the compulsion to keep learning new languages as a form of pleasant addiction.

> "I see myself as a language enthusiast. […] A language lover – yes. And that is the term that I use, because it doesn't imply any claim as to success, but it does very well describe the stage I am, what I am about. So 'language lover' yes, because I am going to start learning languages just because they are there and [*slight pause*] for pleasure of it. […] So I would call myself a language enthusiast, a sort of language addict, you could say. But again, this implies there is some sort of pain, which there isn't. It's pleasure" [ibid., p. 136–137].

PAR 17, who is of Greek origin, saw in his enthusiasm for language learning even a connection to the Greek gods. He said:

> "I like 'language enthusiast' the most, because then it doesn't need any classification. I don't have to be worried about whether I am a pentaglot or a polyglot according to these laws. I can just enjoy. It shows more enthusiasm. Enthusiasm is even in the word 'language enthusiast'. And that is an old Greek word as well. *ενθουσιασμός <Greek>,* it is like you have got some spirit in you about it. It's a kind of connection to the Greek gods even, you can say, like you have been sparked with the spirit from the Greek gods that burns in you and you can then express it on the outside. So there is a deeper meaning as well in the root of this word as opposed to just 'many languages' of polyglot" [ibid., p. 137].

Research question 2: Language maintenance

RQ 2: How do experienced learners of multiple languages maintain a complex psycholinguistic language system? Which importance do they attach to language maintenance? Which role does multilingual awareness play in language maintenance? Which maintenance strategies do they employ?

This group of questions of the doctoral thesis shall be presented in greater detail.

Language systems explored and gradual language loss

Research into adult multilingualism is very complex. All eighteen PAR had very diverse language learning paths since they come from nine different countries (Belarus, France, Greece, Italy, Mexico, Sweden, Russia, the United Kingdom, and the USA) and had studied in very different school systems. The majority of the PAR (56%) who would later become polyglots had been raised monolingually (PAR 1, 3, 5, 6, 7, 9, 10, 13, 14, 18). Twenty-eight percent (PAR 4, 8, 15, 16, 17) had received a bilingual upbringing. PAR 2 and 11 had come in contact with a second and third language in childhood but in the family only one language had been spoken. Only PAR 12 had a multilingual upbringing in the family of origin. The first additional language was often learnt at high school or in tertiary education, but the bulk of languages were acquired later and mostly autonomously. The author of this study wanted to gather a picture of

the *holistic multilingual psycholinguistic systems* of the respondents, as she termed it, that also comprised classical, constructed and semiotic languages such as sign languages. The language systems that PAR had listed in the questionnaire and the interview can be found in Appendix 2.

Only two PAR had studied only Indo-European languages, the other 16 had also explored non-Indo-European languages spoken in Europe, Africa, Asia, Central America, and the Middle East. Esperanto as a constructed language had been learnt by four respondents, while PAR 9 had studied both Esperanto and Toki Pona. The British or American Sign Languages had been explored by two PAR. Seven PAR had studied classical languages like Ancient Greek, Latin, and Sanskrit. Argüelles, next to these, had also studied Old High German, Middle High German, Old Norse, Old French, Old Occitan, Old English, Middle English, Middle Dutch, Old Swedish and Gothic. Both Argüelles and Simcott, who had explored LS > 40, list language families rather than single languages. Simcott has a very varied repertoire:

> "I have studied pretty much all of the Romance and all of the Slavic languages, all of the Germanic, which is already a lot, without going out of the Indo-European. And then Latvian, Estonian, Finnish. [*slight pause*] I've looked at Lithuanian in the past but not very well, and then Arabic, Japanese, Chinese, Thai, Hebrew, sign language and Celtic languages like Manx and obviously Welsh. So this is a lot of languages. And then some of the constructed languages. I've looked at Toki Pona and I've studied Esperanto. At the moment I am learning Honduran Lenca […] and Nawat […] which is spoken in, it's kind of, like, Nahuatl from Mexico, but it is from El Salvador. So those two. And then Romani language. At the moment I am trying to improve my active level in Romani, because this is a language that I can use here. I have gone for functional languages that I can actually use" [19, p. 194, 348].

In Appendix 3 the LS that are actively maintained by all PAR are listed as well as the self-rated language proficiency that has been elicited with the questionnaire on a scale from one to five: *elementary* (1), *pre-intermediate* (2), *intermediate* (3), *upper-intermediate* (4), and *advanced* (5).

Simcott, who had explored LS > 40, wrote that it was impossible for him to assess the proficiency levels in his languages accurately [ibid., p. 196]. Similarly, Argüelles had not given any proficiency levels in the questionnaire himself but had agreed to the use of the reading abilities in his languages from his website, which then was still available [ibid., p. 188, 321].

Exploring so many languages is certainly a great achievement, but maintaining them is assumed to be even more challenging. From a CDST perspective, the DMM posits that language development is non-linear and will change over time. It hypothesizes that noticeable forms of language attrition will set in after a period of non-use and will affect the different LS to unequal degree; in underdeveloped systems the effects will be visible soon, while in well-developed systems the phenomenon will set in with a delay. Although no question in the interview or the questionnaire was aimed at eliciting data on gradual language loss, 17 out of 18 PAR spoke about it either as a general phenomenon or as an issue they had observed in other polyglots or in themselves. PAR reported it in the following LS: PAR 1 Albanian, Romanian, Singhalese, Bahasa, Malagasy; PAR 2 & PAR 10 German; PAR 3 & PAR 4 Chinese; PAR 4 & PAR 9 Japanese; PAR 4 Spanish; PAR 9 Faroese; PAR 10 Russian; and PAR 11 French. To illustrate the language attrition in Chinese, see Transcript (henceforth T) 1 in Appendix 1.

Language maintenance and language proficiency

Data from the study confirms the assumption of the DMM that the attrition process depends on the proficiency level in the LS and that it will set in later in well-developed systems which the PAR have pinpointed at an upper-intermediate or advanced level. Here is what PAR 18 noted; in Appendix 1 there is another example (T2).

> "Of course, it very much depends on the level you already have in one language. The lower it is, the more effort you need to maintain it. And once you reach like B2–C1, it is much easier to maintain it or, if you haven't used it for a long time, you can refresh it much more quickly" [19, p. 217].

Perceived importance and difficulties of language maintenance

When multilingual speakers notice phenomena of gradual language loss, according to the DMM, they will try to counteract the language erosion by an increased use of compensatory strategies. In the interview, PAR were asked to rate the importance that they attach to LM on a numerical scale from one to five (5 = very important, 4 = important; 3 = quite important; 2 = little important, 1 = not important). Ten PAR used numbers from one to five; four used intermediate numbers; and two only gave a verbal explanation. In fact, all PAR generated non-elicited verbal explanations that offer valuable insights. Polyglot Luca Lampariello gave the following explanation:

> "It really depends on what you want to achieve. To me, personally, I give more importance to maintaining than learning. When I learn a language, I make sure that an hour is dedicated to learning and all the rest is dedicated to maintaining, so for me maintaining is, let's say, 4 out of 5 because the fifth would be learning other languages, but the bulk of the work is actually maintaining and having a lifestyle that helps you sustain what you have" [ibid., p. 221].

Rawlings explained the importance of LM with a Russian saying:

> "Five […] Because… one of my Russian teachers when I was in Russia told me there is this expression which is like, 'Learning a language is swimming against the current. The moment you stop swimming, you'll float back'. It's the same with a language. If you don't maintain it, if you don't plan how to keep it going, you'll forget it all" [ibid., p. 222].

All PAR are aware that gradual language loss will set in if not enough time and energy are invested into LM.
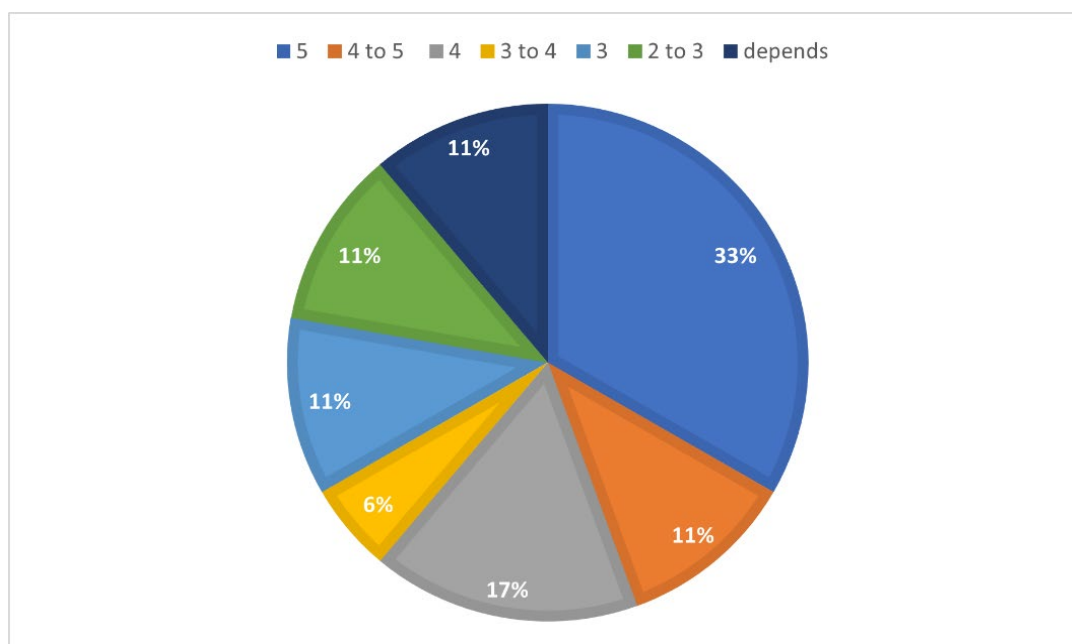

Figure 1. Perceived importance of language maintenance
Very important = 5; important = 4; quite important = 3; little important = 2, not important = 1.
PAR also used intermediate values.

As Fig. 1 shows, 51% perceive LM as very important or important, 17% as quite important, 11% as little to quite important, and another 11% do not attach a number but explain that the importance depends on the resources at disposal and on the aims in the target languages, and may even change in the future when the number of LS in the repertoire may increase.

All PAR are aware that time and energy resources that can be devoted to LM are limited. They also note that the LM process becomes difficult and requires brain power especially when the LS to be maintained are > 10 (e.g. T3). They state that it is difficult to practice many LS in one's daily life and sociolinguistic context (see transcript of PAR 13 below) and that LM requires a careful planning and an extra level of motivation, which is greater than the one needed for language acquisition.

> "…I can assume it is probably tough to maintain more than 10–11 languages to, like, a fluent level. Yeah, because you know, the time you have in a day is limited, so you can't just [*incomplete sentence*] it's probably, like, you probably can't practice more than 10 languages a day, or rather, more than 4–5 languages a day unless you have a special occasion like the Polyglot Gathering or the Polyglot Conference" [19, p. 227].

PAR 13 (see T4) also speaks about the difficulty of maintaining different scripts, in his case Chinese and Japanese, which is a very time-consuming process. The knowledge of the many characters seems to attrite fast if they are not constantly revised.

Time management and maintenance routines

Speakers of multiple languages only have a limited amount of time to devote to both language acquisition and language maintenance. All PAR are aware of this problem but approach it differently. While some follow a relatively set schedule and have routines to learn and maintain their LS on a daily or weekly basis, others are less systematic but are nonetheless aware of the necessity of counteracting attrition. Very often they maintain the target LS with activities that they perceive as pleasant and relaxing. All try to reduce LME by integrating both learning and LM into their daily life, very often in small units that fit well into the busy time schedules of adults. The PAR who follows the strictest language workout is Argüelles. He had also described it in Erard's *Babel No More* [6]. In the interview in 2017, he admitted that his maintenance regime had changed since his life circumstances had also changed and he was then devoting some time to writing a novel (T5).

In T6 one will find an excerpt of the interview with PAR 6 who does not follow a strict LM regime but is always mindful of it.

The role of the M-factor in LM

The 90 codings used in the study show that all PAR have an enhanced multilingual awareness due to the many LS in their repertoire and their language learning experience. They are all able to define proficiency levels and the perceived needs of maintenance for all their LS clearly. Simcott, for instance, tells that maintaining Polish does not take long for him since he speaks many Slavic languages which he uses at home and in his environment on a daily basis. Many cognates and loan words help him to revive not only Polish but also Turkish while speaking Macedonian (T7).

Language maintenance strategies

Experienced language learners like polyglots are highly autonomous and use a great variety of language learning strategies. The current study found ample evidence for this claim. From the interview data it emerged that polyglots were also able to use their multilingual expertise as a strategic source in LM and language management. To the best of the author's knowledge, language maintenance strategies (LMS) had not been described systematically in academic literature before. All PAR reported on a great number of tools and methods for the maintenance of the targeted LS. They described, for instance, that they revised grammar and vocabulary by using language learning apps or grammar books. They also practiced their speaking skills by engaging in conversations with native speakers whenever possible: in restaurants, at work, on the Internet, or at cultural events of the target language or by attending local or international polyglot events. Besides, they revised their target languages by reading non-fiction and fiction and by listening to podcasts, songs, radio programs or by watching the news, Netflix series, videos or weather forecasts in multiple languages.

The author of this article tried a classification of the above mentioned LMS. She identified two higher-order LMS (HO-LMS) such as "HO-LMS 1: minimizing LME by resorting to language learning experience and multilingual awareness" and "HO-LMS 2: minimizing LME by maximizing language use". She further classified a number of LMS for both higher-order strategies that are aimed at minimizing LME.

HO-LMS 1: minimizing LME by resorting to language learning experience and multilingual awareness includes LMS in which the multilingual speaker/learner makes use of his/her knowledge about multiple languages, knowledge about learning, and about language learning to minimize the LME.

HO-LMS 2: minimizing LME by maximizing language use includes LMS with which the multilingual speaker/learner tries to maximize language use to keep his psycholinguistic system stable.

Both higher-order LMS can be further subdivided as the following table shows (Table 2). The single LMS are often interconnected and a clear distinction is not always possible.

1	HO-LMS 1: minimizing LME resorting to language learning experience and multilingual awareness
1.a	LMS resorting to language learning experience
1.b	LMS resorting to multilingual awareness
1.c	LMS identifying proficiency levels and objectives
1.d	LMS developing maintenance habits
2	HO-LMS 2: minimizing LME by maximizing language use
2.a	LMS practicing productive skills – speaking
2.b	LMS practicing productive skills – writing
2.c	LMS practicing receptive skills – reading
2.d	LMS practicing receptive skills – listening
2.e	LMS maximizing language maintenance in daily life
2.f	LMS maximizing language use by engaging in cultural activities in the target language(s)
2.g	LMS maximizing language use in the profession
2.h	LMS maximizing language use in the family
2.i	LMS maximizing language use with friends
2.j	LMS maximizing language use with the polyglot community
2.k	LMS maximizing language use – travelling to country where target language is spoken

Table 2. Language maintenance strategies used to minimize language maintenance effort

In Appendix 1, four examples are given: for 1.c) LMS identifying proficiency levels and objectives (T8), for 1.b) LMS resorting to multilingual awareness (T9), for 2.a) LMS practicing productive skills – speaking (T10), and for 2.d) LMS practicing receptive skills – listening (T11). In the following example, PAR 8 was asked if the polyglot community played a role in LM. His answer is an example for 2.j) LMS maximizing language use with the polyglot community.

> "It is important. I feel very motivated by the people from the language learning community. I feel very motivated to set myself new goals and to start new projects. And I like to see what they are doing. When you see how much they enjoy it, it reminds you that it is something you really *enjoy*. I think, without knowing so many other people who share the same passion as me, it would be harder to maintain it as a hobby. Actually, because so few people learn languages in quite this way to quite this extent, ironically, learning all those languages could be quite isolating if you didn't know other people who do it too, because all your monolingual friends would just ask: 'Why would you do that? Why would you waste your life learning all these languages?' So, you know, it's nice when people understand you and do the same thing" [19, p. 269].

Like PAR 8, many other respondents also mentioned that the polyglot community played a role not just for language practice at these events but as a booster for motivation necessary for LM. Interviewees said to be motivated and inspired by other like-minded people. Keeping motivation high is perceived as important for sustaining long-term goals and efforts.

The qualitative data of the current study offered ample proof that experienced language learners like polyglots use a broad range of strategies for language learning, language maintenance, and language management that they skilfully combine and orchestrate through metacognition. Griffiths' claim that strategy orchestration is complex and that its development follows a non-linear pattern [7, p. 183, 185] was confirmed by the analysed data, but the author of this paper proposes an alternative term for Griffiths *tornado effect* for the description of dynamic strategy development since it may have a destructive connotation. She suggests the more neutral term *enhanced strategy effect* (ESE) instead, which would be in line with the wording from the DMM, namely *enhanced multilingual monitor*. She also identified a new emergent property in experienced language learners like polyglots that she called *smart strategy orchestration* (SSO). This property results from the simultaneous learning and maintenance of many language systems and from a smart management of the limited time and energy resources. Polyglots will try to minimize LME through SSO according to the principle of economy of effort which Herdina & Jessner derived from a generalisation of Zipf's law of least effort [8, p. 102]. Two examples shall illustrate the SSO:

> "[…] the strategies? Well I mix. I have a system: systematic lessons, that is what I do in the mornings and at night I watch a TV series, a film. […] In the morning I always do something with a book. I need for everything a book, several books. I have for each language several methods, yeah, and teachers" [19, p. 278].

> "I read a bit Welsh most days and I also check Welsh news sites every day. On Facebook I post in Russian or German with many people I know. […] So I've been using exams actually as a way of focusing and tuning up my advanced languages, because that gives me a goal, it is objective, it gives you a bit of pressure. I have also shared a house. So I have shared a house with Welsh speakers" [ibid.].

Research question 3: Which factors play a major role in the maintenance of multiple languages?

The DMM assumes that the complexity and variability of a psycholinguistic system are influenced by individual cognitive factors as well as by societal factors. Biological factors like gender and age are hypothesized not to be as relevant.

Since gender distribution is not balanced in the current study, the role of gender in LM could not be explored in depth. From the analysis of the data collected with the questionnaire and the interviews, no gender difference could be detected, only that answers regarding identity and language learning seemed important to all female PAR. A comparison with male PAR cannot be drawn since not all were asked a question on this topic.

Age could be partly investigated since PAR are of different age groups. Findings confirmed that respondents continued the accumulation of linguistic knowledge throughout the lifespan even at an advanced age > 60. This is in line with research done in the author's doctoral thesis that had described language acquisition until an advanced age of some polyglots of the past like Cardinal Mezzofanti [19, p. 79–85] and Kató Lomb [ibid., p. 89–93]. In Table 3, the number of LS explored is set in relation to the age group of the PAR. The amount of LS is grouped in ranges (6–10; 11–20; 21–30; 31–40; > 40) since PAR 5 and 9 with LS > 40 tend to think in language families rather than in single LS. While PAR aged 20–30 have already explored 9–15 LS, all PAR who have learnt LS > 21 are older than 31. The accumulation of linguistic knowledge can therefore progress with age. However, as PAR 1 (Helen Abadzi, a cognitive psychologist) revealed, forgetting in one's old age is faster than in one's young age. She speaks about how switching between languages becomes more difficult as this process becomes more conscious and time consuming with age. Yet, she recommends the process as a good anti-aging exercise.

Range of languages explored	Participant	Number of language systems	Age group
6–10	PAR 2 PAR 6 PAR 11 PAR 15	7 + 2 9 9 9	31–40 20–30 20–30 20–30
11–15	PAR 3 PAR 4 PAR 7 PAR 8 PAR 10 PAR 12 PAR 13 PAR 14 PAR 16	14 12 11 15 12 16 11 11 12	31–40 20–30 31–40 20–30 41–50 51–60 20–30 31–40 41–50
16–20	/	/	/
21–25	PAR 18	23	31–40
26–30	PAR 1 PAR 17	26 28	61–70 41–50
31–35	/	/	/
36–40	/	/	/
> 40	PAR 5 PAR 9	Both PAR do not tell a precise number; PAR 9 LS > 50	51–60 31–40

Table 3. Number of language systems explored in relation to age

Data generated with the questionnaire reveal that adults can learn a great number of LS well after the end of the critical period and can attain advanced proficiency in many of them (see Appendix 3). This seems to confirm the hypothesis of the DMM that it is the LAE and the LME that hamper language development rather than age.

The present study focused on psychological factors and investigated into factors such as *the love for languages, motivation, attitude towards other languages and cultures, empathy with other people via their languages, self-discipline, perseverance* and *can-do attitude* as the subcodes in the theme of *characteristic features* of a polyglot were called. The love for languages impacts the life of PAR considerably and is connected to intrinsic motivation, attitude towards other languages and cultures, and empathy with other people via their language. The following example shall illustrate this claim (T12, T13, and T14 can be found in Appendix 1).

“When it comes to Portuguese it is by far my favourite language. It is the language that I literally get excited to speak. Even thinking about it, my neurons and my adrenaline is like lighting up right now if you had a brain scanner. I believe that is where I feel the most myself comfortable and really-really truly me. And I believe it has a lot to do with the culture, which is open-minded, free-spirited and fun. Of course, there's some downsides to the Brazilian culture, which I won't get into, because it is perfect in my mind, but the idea behind the Brazilian culture to me has always been beautiful and when I fully immersed myself, I found my [*slight pause*] nature in this world. Even if I am there only for 12 hours for work, I am glowing, and I am standing taller and I am in my element. So I go for any opportunity to speak Portuguese whether it is a Portuguese person from Portugal or a Brazilian, there is always going to be me trying to speak Portuguese” [19, p. 143].

Hyltenstam [13, p. 172–173] and Sankò [22, p. 310] list intrinsic motivation as a characteristic feature of a polyglot. From a DMM standpoint it can be assumed that motivation may play a relevant role the general language effort (GLE), which is the sum of LAE and LME. Every PAR was therefore asked why they invest so much time in language acquisition and LM and what their inner drive was. These answers and other non-elicited answers resulted in 40 codings on motivation. Despite individual differences, the following commonalities could be detected [19, p. 161]:

   a) desire to connect with people on a deeper level through the interlocutors' native languages (PAR 2, 3, 6, 8, 14,15,17, 18);

   b) desire to understand the world and other cultures better (PAR 3, 6, 8, 11, 13, 18);

   c) language learning as a way of improving the self or as a part of one's identity (PAR 3, 5, 6, 18);

   d) motivation seems to become a self-sustained system with increasing language learning experience (PAR 1, 3, 9, 10, 17);

   e) pleasure of speaking / pronouncing sounds in other languages (PAR 10, 11, 12, 16);

   f) interest in other cultures and people as reasons for travels (PAR 3, 6, 13);

   g) awareness of cognitive and metacognitive benefits (PAR 3, 9);

   h) utility in the profession (PAR 1, 3).

It is noteworthy that with increasing language learning expertise, motivation seems to become self-sustaining. One excerpt from the interview shall exemplify this claim; two more can be found in the appendix (T15, T16).

> "I was always excited by that idea of, again, to communicate in a different language. Of course, then the more you know about anything, the more interesting it gets. It is like wine. The more you know about it, the more you become a connoisseur. That is true of anything. Any intricacies become self-sustaining" [19, p. 158].

6. Discussion

Despite some overlaps with the term *multilingual*, a representative of the population explored in the current study should be termed with a distinctive term. The author of this paper proposes to use *polyglot* for expert learners of multiple languages who are characterized by a life-long passion for language learning. She does not pinpoint her definition to a specific number of languages learnt, nor to proficiency levels, but to characteristic features. Becoming a speaker of a great number of languages is the result of hard work and a strong devotion to language learning and maintenance. A considerable amount of time and effort is invested into the process over the years, which can continue till an advanced age. This has a deep impact on the polyglot's life, social relationships, and often work too. With increasing expertise, the motivation to keep investing in continuous language learning and maintenance seems to become a self-sustaining system. The love for languages, a cosmopolitan and open-minded attitude towards other languages and cultures, and the desire to communicate with the interlocutors in their languages support the motivational factors.

Yet, since there is not only positive progression in language learning, but also language attrition if the languages are not used, self-discipline and perseverance are necessary character traits to keep the process going and the psycholinguistic system stable. Polyglots are highly aware of the phenomenon of gradual language loss. However, as expert language learners they are able to orchestrate the strategies for language acquisition and maintenance (an emergent property that they develop) smartly to reduce the general language effort (GLE) through multilingual awareness. To minimize LME, they use a wide range of LMS which have been described in the current study. Polyglots are able to define their proficiency levels and language goals clearly. The levels in their languages may range from advanced to elementary and are subject to change in the course of their life-span. Polyglots decide when to invest more or less energy into maintenance according to life circumstances and goals.

Is it certainly advantageous to become a polyglot if one has been raised in a multilingual family or a multilingual environment or has received early multilingual instruction, yet this is no prerequisite. As the study shows, most future polyglots have been raised monolingually. Some claimed to have discovered their love for languages early in life and to have learnt one or two additional languages at school, but most PAR reported to have learnt most of their languages as adults, often even after tertiary education, and to have studied them mainly autonomously. One way to enhance their motivation and their self-directed

study is to follow members of the polyglot community who share their expertise in language learning via YouTube, websites, social media, and books. Online and offline meetings at international polyglot events are especially inspirational and boost their motivation.

7. Conclusion

The world of polyglottery is a fascinating phenomenon which needs to be explored in greater depth. The present study may offer some valuable insights for further investigations. Neuroscientists could work together with researchers on polyglotism and with scholars in the field of TLA who operate from a CDST perspective to investigate the complexity and interrelation between neuro-, psycho- and sociolinguistic aspects of multilingualism.

More light must be shed on the phenomena of language attrition and language maintenance in speakers of many languages by taking into account their holistic multilingual psycholinguistic system. The elaboration of a more fine-grained language maintenance strategy repertoire is a further research desideratum.

The definition of the term *polyglot* in this paper and its distinction from definitions of *multilingual* may serve as a contribution to the ongoing debate in the field of multilingualism and polyglotism. It is also advisable to reflect about the term *hyperpolyglot* in research and in the media.

Since the author of this paper is a language teacher at a high school, she can see the relevance of the findings of the present study in educational settings in her daily work. The strategies of successful language learning experts should be applied to language instruction and language learning in educational settings from the primary to tertiary education. Strategy training should play a more prominent role in language instruction. No ready-made, pre-set formulas of language acquisition and language maintenance strategies can be taught, as strategy use is highly idiosyncratic, but a wide range of smart language learning techniques used by language experts like polyglots can be offered at all levels of instruction, even more so where curricula are conceptualized from a holistic standpoint like the ones proposed by the various common language curricula. The importance of enhancing multilingual awareness as the key to language learning success and of fostering the love for languages in the language classroom should be taught in teacher training courses and be passed on to learners at school and university.

The shining example of language enthusiasts like polyglots with their smart strategy use, their open-minded attitude towards other languages and cultures, their diligence and self-discipline can be taught by using the great number of videos and podcasts that these language lovers share on their channels, websites, and social media platforms. Their love for languages and their expertise can be a precious source of inspiration for the Mezzofantis of the future.

Appendix 1

Transcripts from the interviews

T1: Chinese is the language I am neglecting the most. It is really important, but I haven't spoken it in two years, and the interesting and amazing thing is that not speaking it – and I used to speak it fluently three years ago – but not speaking it *at all* for three years [*incomplete sentence*] I had a Chinese guest here and I could not even come up with a word like 'work'. I didn't remember, because when you don't use a language *at all,* then it shrinks, no matter your level. My level of Chinese: it got to be B2 but then in shrank because I didn't use it [19, p. 219].

T2: Because I have reached a very high level, my experience is, you don't really need to maintain those languages. If you go back to them, if you live in that country, you are going to be back at a high level. My belief is that you only really forget if you are below the B2 level, then I think there is a risk [19, p. 216–217].

T3: So what happens is that basically you can learn as many languages that you want, but then you can have limits in the amount of languages that you can use every day. […] Everybody is different, but I think that you can learn as many languages that you want. The main problem is maintaining them: it needs a lot of brain power. We have 14 hours a day, let's suppose we have 14 hours a day when we are awake. We cannot spend 14 hours a day to do that. There is one person who does that whose name is Prof. Argüelles [19, p. 227].

T4: There is one more aspect, well, that not everyone thinks about, especially people who don't learn Asian languages, especially languages for which you need to learn [*unclear*] characters. As you probably know, there are quite a lot of Chinese characters and maintaining your Chinese character knowledge is something really tough and really demanding in terms of energy and it tends to attrite quite quickly. So I think, you know, like for Japanese and Chinese, if you really want to keep them at a high level, you need to read and write them as well. That takes a lot of time [19, p. 228].

T5: These days actually, as I mentioned in the Conference, I am actually kind of almost shifting gears, at least temporarily. I am trying to write a novel. In English. So that's a lot of the time that, if you had asked me this question a year or two ago, I could have given an answer much more easily along the lines described in the Michael Erard interview. And I still do things, like here I have [*shows the interviewer his books; incomplete sentence*] These are the advanced ASSIMIL for Arabic and Russian. And you can see I have all these stickers and notes in them. I have studied these thoroughly, and every single day I make a point of systematically going through and covering certain lessons for them. So where is my notebook here? So there are 70 lessons in each book, and it is supposed to get you to C1 level, and they are quite rich in terms of vocabulary and stuff like this. So I have studied them thoroughly, and now what I am trying to do is to entirely digest these, let's put it this way, I am not trying to memorize them per se, but that is basically what I am doing. If I can memorize everything in here, all the structures, all vocabulary, then I'll be really quite solid. So every single day I take [*incomplete sentence*] The book is divided into 70 lessons, so I have divided it into 10 sections a week, okay, so every day I will take, like if I do this today, today I would do lesson 3, 8, 15 and 22. That would be one like 15 to 20-minute session. Then I'll do the same in Russian. Then I'll do something else. Then, the next time I will do lessons, as they are getting longer and getting harder, I will do 29 and 31. I spend like 15 minutes of the time with this book [*ASSIMIL Arabic*] and then with this book [*ASSIMIL Russian*]. Then I put them aside and do something else, and then at another point in the day I come back and I do these, because Russian and Arabic are two languages that are very interesting and important to me. They are objectively hard and difficult languages to me. They are languages that I have got a lot of study in, but I need more active practice. These two things that I con-sciously do. Apart from that, just in terms of the other languages, the bigger languages that I know better, like French and German and Spanish, I just try to read, to read really good literature, a good book or a

good novel in those on a regular basis. And then in terms of the other languages that I have studied, the older languages, the philological languages, that I have no chance to speak, likewise I try to balance. I read a book in Old Norse and then I read a book in Middle High German and then I read a book in another dialect. So I try to keep a cyclical balance going like that. I'm also teaching my sons a lot of languages. Every morning I sit down with my sons and we study German, Spanish, Russian, Latin and Korean. So I sit with them and we do those languages every morning. I speak French with my sons. I try to speak as much Korean as I can with my wife. At work there are some Russians. I try to speak Russian and Arabic at work too. I try to balance and integrate them into my life. At the time of the Michael Erard interview, I was living very isolated. All I could do was just sit and study at my desk and do not much else, whereas I am in the position now where I have a bit more ability to get some practical use and talk. So I try to do that. And like I said, a couple of years ago I kind of started to shift gears. I wanted to do something creative myself. I didn't want to just study grammar but do something creative. So I spend about, er, two hours or so, maybe sometimes three hours a day writing, while in the past that would all have been language study. So in the past it would have been more language study, more stuff like that [19, p. 230–231, 332–333].

T6: I mean, I don't plan it. My maintenance is not planned. My learning is. But it really has to do with the way I learn and maintain languages with my specific method. Once I get to the stage where I am speaking with native speakers freely, I just do it. I look up words, I do vocabulary, I memorize [*unclear*], and if there are any words that come up in conversation that I don't understand, then I look them up and try to learn them as best as I can and try to remember them for next time. So I don't sit down every morning and say: "Okay, today I am going to work on Russian, Italian, Spanish". I don't do that. When I am learning a language, I do. I have to do a lesson on German today, so probably I am going to do vocabulary. My maintaining typically has to do with speaking to native speakers. If I don't have a native speaker to talk to that day, maybe I listen to a couple of songs in that language or watch a newscast or maybe a funny video in that language. So it is not really systematic, more spontaneous I would say [19, p. 233–234].

T7: I knew when I started learning Polish that I didn't need to speak it perfectly or to very-very high level. Because I already speak Slavic languages at home and around me on a daily basis and because Polish is a Slavic language, there are certain things that remind you of Polish when you speak in a Slavic language. It never disappears completely. Okay. So my goal in Polish was to get communicational in the language at A2/A1 level where you can actually talk to people and it's fine. To revise that level of language wouldn't take very long. You are not talking about many words. You are not talking about 10,000 words like you need like, for example, for C2 or more level where you need thousands and thousands of words. You are talking maybe of 5,000 words. But when we are speaking about languages that are similar, we are probably talking about maybe 1,000, maybe max that are different. You know, I speak Macedonian at home, 'вода' is water in Macedonian, 'woda' in Polish. I think 1,800 words are the same in all Slavic languages. So before you begin with a language, of that family particularly, you already have all these words. Turkish: in the Macedonian language you already have 5,000 or 6,000 Turkish words… So if I haven't been speaking Turkish for a while, because I speak Macedonian, Turkish will never go completely. Reviving Turkish would be harder for somebody who just speaks English. So it is understanding where [*incomplete sentence*] what level you need, how much maintenance you can realistically put in. So for a language like Polish, I would probably not revisit Polish more than once a year [19, p. 238, 355–356].

T8: 1.c) LMS identifying proficiency levels and objectives: The bottom line of this is: we need discipline, passion, organization, but the more languages you speak, when you speak more than ten, it is *really* difficult to keep them all at the same level. You always have a core of languages that I can speak very well and I use, and other languages you speak less or that you are learning or that you speak less or that you don't use at all – depending on your priorities. If, next year I will go to China, just to give you an example, I will make sure that Chinese – Chinese is a very important language – so I will go back to it, but as of now I have other priorities. I have getting Hungarian to a decent level, getting Russian to a C2, and at the same time I want to keep practicing Polish and Japanese. These are four languages, and four is a lot, when you have also six, seven or eight in the background [19, p. 247].

T9: 1.b) LMS resorting to multilingual awareness: And how do you maintain? […] You have got to go back to the books that you used to have. There is this cognitive psychology concept called the retrieval path and it is very explainable on the basis of the fact that knowledge is set up in networks. You encoded something in a network. This is the way it will be relearned, and this is the way it will be retrieved. Now. The smart thing to do forever is to keep your books or to go back and find your books. Let's say you studied German from a whatever book thirty years ago, go back and find those books and you will see the difference. Better yet, if they have kept your marginal notes, because then you see what something reminded you of. And once you have finished the review of the known stuff, then you go to the unknown stuff. Otherwise you are creating new cognitive networks, wasting time, not being sure what anything is [19, p. 243].

T10: 2.a) LMS practicing productive skills – speaking: I do use SharedLingo just to practice with people in their native tongue, which could be French or Portuguese or German and I then help them with a few minutes of English. I use HelloTalk as well, but I am not systematic about it, nor am I consistent about it. It is more the people that I am lucky to encounter whether at a language exchange or at my Language Lounge that I host in New York or wherever else I am hosting events, but I also go to events that other people are hosting and I look for the flags and I consciously speak that language that I want to get the practice [19, p. 251].

T11: LMS practicing receptive skills – listening: I used to watch a lot of American, mostly American – and this is where my accent comes from – American movies and American TV shows. Especially TV shows are very useful, because you get used to the characters and every episode it's mostly the same routine and it is very good for maintaining your language. I noticed, and I cannot explain it, when I watch movies, probably my articulation organs are following the actors' articulation and I feel that my pronunciation gets better, even if I don't speak it and I just watch it. When I start speaking it, my pronunciation sounds better. […] Sometimes if I had the idea to brush up my Serbian, I would listen to some music and I would watch some movies probably [19, p. 255].

T12: And like Steve Jobs said in 2005 in that famous speech of his where he talks about this, that the job you have is a big part of your life. If you choose the job that you like, you know, that you love and you do what you love, then things are going to wind up and you are going to be satisfied. And I made that specific choice that allowed me not only to speak languages in real life, but also at work [19, p. 144].

T13: From my experience, people – at least at these kind of events, these language-related events – they are open-minded. They share their passion for languages. They are really cosmopolitan. […] They share a globalist view. They are curious. They are eager to learn new things and new languages. And when you learn a new language, you learn a new culture. So you are more open to other kinds of cultures, to other kinds of religions, political views and so on and so forth, because every country is different. And when you are learning a language, you are learning the history of a country [19, p. 146].

T14: And so for me, again, the most important thing is to connect with them through their heart rather than using people to kind of practice or things like that, because if I wanted to practice, I could go on italki or go on HelloTalk. You know, there are so many apps [19, p. 151].

T15: It is for two reasons. Because for my inner world, my inside world, and for my outside world got so much better. In terms of my inner world, so to say, I understand people better, I understand different perspectives, it helped me understand how people think differently, to empathize with people, to find a job, to travel better, to warm up with people, to find friends, to find girls, everything has become so easy: communication, going out, finding people, finding jobs. It's amazing what the benefits of language learning are. And the second reason is because I want to understand the world. This is what drives me. Since I was a little kid I got these books, I was surrounded by books and I was surrounded by interesting people: my mother, my grandmother, my grandfather, all passionate and thirsty about knowledge and they really inspired me to understand the world. Languages for me are just a tool to understand the world. And another thing, and the second thing is that actually my brain actually works faster. So all the cognitive

benefits: I think faster, I elaborate faster. So language has to do with other things. So my brain has become more powerful. Language learning is a training. So it is a training for your mind, it is a training for memory, it is a training for thinking, trying to solve problems. So, on the one side it's the outside world and understand the world that make things so much easier and better and more interesting, and on the other side it is understanding myself better, because through the struggle or the quest of learning languages I have become a better learner and I my brain works faster. There is not one bad thing about learning foreign languages, and they even said it delays Alzheimer's. So better than this, I don't know [*laughs*]. What else, what other reasons do I need? [19, p. 156]

T 16: It is just very rewarding, because after your first, your second and your third language you start to understand like how to do it efficiently, and once you know how to do it efficiently, it becomes a little less painful, but also the reward stays the same. For me making yourself a more tolerant, knowledgeable, open person, I think, is very rewarding for anyone to have, and it can lead to many other very good personal qualities and it can lead to positive achievement. Positive – you know, improvement of the human race. That is a great thing, I think. Yes, that's my motivation. It's kind of a system in itself [19, p. 157].

Appendix 2

Holistic multilingual psycholinguistic systems

Participant	Language systems explored
PAR 1	**Indo-European:** Greek; English, German; Spanish, French, Portuguese, Italian, Romanian; Albanian; Russian; Hindi, Nepali, Bengali, Sinhalese. Classical languages: Ancient Greek, Latin; Sanskrit **Non-Indo-European:** Japanese; Bahasa, Khmer, Chinese, Modern Standard Arabic, Hebrew, Swahili, Wolof, Malagasy **Constructed languages:** / **Sign languages:** /
PAR 2	**Indo-European:** English, German, Italian (plus Neapolitan and Cilentano dialect), Spanish, Portuguese, French, Polish **Non-Indo-European:** / **Constructed languages:** / **Sign languages:** /
PAR 3	**Indo-European:** Italian (can do Italian dialects), French, Spanish, Portuguese; English, German, Dutch, Swedish; Russian, Polish. Classical languages: Latin **Non-Indo-European:** Hungarian; Japanese, Mandarin Chinese **Constructed languages:** / **Sign languages:** /
PAR 4	Indo-European: French, Italian, Spanish; English, German; Russian; Hindi. Classical languages: Latin Non-Indo-European: Tamil, Korean, Chinese, Japanese Constructed languages: / Sign languages: /
PAR 5	As he has spent all his life studying languages, he finds it difficult to tell how many languages he has explored. Borders between languages become blurred. He thinks in terms of language families. He knows the Germanic and the Romance family thoroughly, the Slavic family to a lesser degree. He also knows many languages that are not related to these families, like Korean. Languages mentioned in the interview: **Indo-European:** Old Norse, Middle High German, German, English, Swedish, Norwegian, Danish; Latin, French, Spanish; Russian **Non-Indo-European:** Turkish, Arabic, Korean, Chinese, Japanese, Swahili (Finnish added in 2019 after the interview, but mentioned in the data sheet) **Constructed languages:** / **Sign languages:** / **On his website:** www.foreignlangugeexpertise.com (no longer accessible) he assessed reading abilities in 38 languages: English, German, French, Spanish, Italian, Dutch, Swedish, Old Norse, Middle High German, Old French, Latin, Middle English, Middle Dutch, Old Occitan, Old Swedish, Portuguese, Catalan, Norwegian (NN), Norwegian (BM), Danish, Modern Provencal, Esperanto, Afrikaans, Icelandic, Russian, Modern Standard Arabic, Korean, Persian, Modern Greek, Frisian, Old English, Old High German, Romanian, Gothic, Ancient Greek, Irish Gaelic, Hindi, Sanskrit. He also mentioned Euskara, Finnish, Shona (a Bantu language), Zulu, Ancient Egyptian, Quechua, Malay Indonesian, Swahili, Turkish, Hindi-Urdu, Arabic, Persian.
PAR 6	**Indo-European:** English (native), German; Italian, Spanish; Russian, Modern Greek. Classical languages: Latin **Non-Indo-European:** Arabic; Mandarin Chinese **Constructed languages:** / **Sign languages:** /
PAR 7	**Indo-European:** Swedish, English, German; Spanish, French; Russian; Hindi, Urdu, Persian **Non-Indo-European:** Indonesian, Mandarin Chinese **Constructed languages:** / **Sign languages:** /
PAR 8	**Indo-European:** English, German, Dutch, Afrikaans, Yiddish; Greek; Spanish, Catalan, French, Italian, Portuguese; Russian, Serbian. He can do British accents and dialects. **Non-Indo-European:** Hungarian, Hebrew **Constructed languages:** / **Sign languages:** /

PAR 9	**Indo-European:** Most Romance languages, most Slavic languages; most Germanic languages; Celtic languages like Manx, Welsh; Baltic languages like Latvian, Lithuanian; Indo-Aryan: Romani. Indo-Iranian: Farsi, Hindi; Armenian; Albanian; Greek. He can do British accents and dialects. **Non-Indo-European:** Estonian, Finnish, Georgian; Mandarin Chinese, Japanese, Thai, Korean, Indonesian, Turkish, Azeri, Kazakh, Kyrgyz, Malay, Honduran Lenca, Nahuatl, Arabic, Hebrew **Constructed languages:** Esperanto, Toki Pona **Sign languages:** British sign Language
PAR 10	**Indo-European:** English, German, Icelandic; French, Italian, Portuguese, Russian; Welsh **Non-Indo-European:** Basque, Hungarian, Finnish, Indonesian **Constructed languages:** / **Sign languages:** /
PAR 11	**Indo-European:** Russian; Serbo-Croatian, Ukrainian; French, Italian, Romanian; English, Dutch, German **Non-Indo-European:** / **Constructed languages:** / **Sign languages:** /
PAR 12	**Indo-European:** Spanish, Portuguese, Italian, French, Catalan; English, German, Swedish; Russian; Hindi **Non-Indo-European:** Hebrew, Arabic; Xhosa, Antillean Creole (Martinique), Haitian Creole (Patois) **Constructed languages:** Esperanto **Sign languages:** /
PAR 13	**Indo-European:** French, Italian, Spanish, Portuguese; German, English, Dutch. Classical languages: Latin **Non-Indo-European:** Japanese, Mandarin Chinese, Korean **Constructed languages:** / **Sign languages:** /
PAR 14	**Indo-European:** Russian, Belarusian, Ukrainian, Polish, Slovak; English; French, Spanish; Hindi **Non-Indo-European:** Hebrew, Mandarin Chinese **Constructed languages:** / **Sign languages:** /
PAR 15	**Indo-European:** English, German, Dutch; French, Spanish, Portuguese, Italian **Non-Indo-European:** Bahasa Indonesia, Mandarin Chinese **Constructed languages:** / **Sign languages:** /
PAR 16	**Indo-European:** French, Spanish, Portuguese, Italian; English, German, Swedish; Slovene **Non-Indo-European languages:** Arabic, Korean, Japanese, Swahili **Constructed languages:** / **Sign languages:** /
PAR 17	**Indo-European:** English, German, Norwegian, Swedish, Danish, Dutch, Icelandic, Afrikaans; Greek; French, Italian, Spanish, Catalan, Portuguese; Russian; Lithuanian; Irish Gaelic **Non-Indo-European:** Finnish, Turkish, Arabic, Mandarin Chinese; Tagalog, Bahasa Indonesia, Bahasa Malayu; Japanese, Honduran Lenca **Constructed languages:** Esperanto **Sign languages:** American Sign Language
PAR 18	**Indo-European:** Italian, French, Spanish, Catalan, Portuguese; English, German, Dutch, Swedish, Norwegian; Russian, Polish, Ukrainian, Serbian; Greek; Hungarian; Hindi; Sinhalese. Classical langues: Latin **Non-Indo-European:** Arabic, Turkish, Mandarin Chinese, Vietnamese, **Constructed languages:** Esperanto **Sign languages:** /

Appendix 3

Self-rated language proficiency in the language systems actively maintained

Participant	Self-rated language proficiency
PAR 1	Greek (native), English, Spanish, French, Portuguese (5) German, Hindi, Arabic, Albanian, Romanian, Hebrew (4) Russian, Nepali, Bengali, Bahasa, Malagasy, Sinhalese, Swahili (3) Japanese (2). She took it out of her language list. Wolof, Chichewa, Khmer (1)
PAR 2	English (native); Italian (4), German (4), Portuguese (4), Spanish (4), French (4), Polish (1)
PAR 3	Italian (native), English (5), French (5), German (5), Spanish (5), Dutch (5), Swedish (5), Russian (5), Portuguese (5); Polish (4), Hungarian (3)
PAR 4	French (native), Tamil (native, but can't read and write Tamil); English (5), Italian (5), Korean (4), Chinese (4), German (4), Spanish (3), Russian (2), Japanese (2) Hindi (1)
PAR 5	On his website www.foreignlanguageexpertise.com (no longer accessible) he assessed foreign language reading abilities in 38 languages. In the interview and in the data sheet corrected at the conference on Metacognition in Multilingual Development in Obergurgl (Austria) on 21 September 2019 he declares: English (native). He knows – as he has studied them thoroughly – the languages from the Germanic family such as German and Old Norse and all the other "dialects" and "variants". The same is true for all the Romance family (Latin, French, and Spanish being the base, all the others the "variants") and for the Slavic family to a lesser degree. In the Slavic family, he has focused on Russian after initially studying the whole family as well. He has studied almost all the Celtic languages, but does not know these well. In the Indic family, he has studied much Sanskrit and Hindi, but these are dormant. Likewise he developed good reading abilities in Persian and Greek in the past, but does not get to use them frequently. He also mastered, knows, and actively uses Korean and Arabic. He has never really mastered or spoken Chinese, Japanese, Swahili or Turkish, but he has studied them thoroughly. He has recently studied Finnish intensively and developed conversational abilities within two weeks in June 2019.
PAR 6	English (native), Italian (5), Russian (5), Spanish (4), Mandarin Chinese (3), Modern Greek (3), Modern Standard Arabic (2), German (1).
PAR 7	Swedish (native), English (5), Spanish (4), Mandarin Chinese (4), German (3), Indonesian (3), French (2), Persian (2), Russian (1), Hindi/Urdu (1)
PAR 8	English (native 5+), Greek (5), German (5), Russian (5), Afrikaans (5), French (4), Spanish (4), Hebrew (3), Yiddish (3), Dutch (3), Hungarian (3/4), Serbian (2/3), Catalan (2), Italian (2), Portuguese (1)
PAR 9	English (native). He states that it is impossible to be 100% accurate in answering this question as there are many levels which change constantly. He speaks five languages at home every day and regularly (English, Macedonian, French, Spanish, and German). He uses many others to varying degrees. Differences in passive and active ability make this question hard for him to answer adequately.
PAR 10	English (native), French (4/5), German (4/5), Russian (4/5), Welsh (4/5). Basque (2/3); Icelandic (1). Hungarian, Italian, Portuguese, Finnish (studied all the grammar, but elementary proficiency. Indonesian (1)
PAR 11	Russian (native), French (5), English (5); Italian (4/5), Serbian/Croatian (3), Ukrainian (3), German (2), Dutch (2), Romanian (2)
PAR 12	Spanish and Portuguese (native); English (5), German (5); Italian (4), French (4), Swedish (4), Russian (3), Hebrew (3), Catalan (3), Hindi (2), Arabic (1), Esperanto (1), Antillean Creole (1), Haitian Creole (1)
PAR 13	French (native); German (5), English (5), Japanese (4), Italian (3), Spanish (3), Dutch (2), Portuguese (2), Korean (1), Mandarin Chinese (1)
PAR 14	Russian and Belarusian (native); English (5), Ukrainian (4), Spanish (2), French (2), Slovak (2), Chinese (1) Hebrew (1), Polish (1), Hindi (1)
PAR 15	English (native), Indonesian (native), French (3), Spanish (3), German (2), Portuguese (1), Dutch (1), Italian (1), Mandarin Chinese (1)
PAR 16	English (native), Korean (4), French (4), Swedish (4), German (3), Spanish (3), Japanese (3), Slovene (2), Portuguese (2), Italian (2), Arabic (1), Swahili (1)
PAR 17	English (5), Greek (5), French (5), Italian (5), Spanish (5), Norwegian (4), Portuguese (4), Mandarin Chinese (3), Dutch (3), German (3), Catalan (3), Russian (2), Swedish (2), Turkish (1), Bahasa Indonesia, Tagalog (1)
PAR 18	Italian (native), French (5), English (5), German (5), Russian (5), Spanish (5) Dutch (3/4, Catalan (3/4), Portuguese (3/4), Greek (2/3), Esperanto (2/3), Arabic (1/2), Hindi (1/2), Hungarian (1)

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