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MARIE SKŁODOWSKA-CURIE ACTIONS

Individual Fellowships (IF)
Call: H2020-MSCA-IF-2016

PART B

"DIVA"

"Disentangling variation: A crosslinguistic investigation of bilingualism and non-standardization"

This proposal is to be evaluated as:

Standard EF

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List of Participating Organisations

Participating organisations	Legal Entity Short Name	Academic (tick)	Non-academic (tick)	Country	Dept./ Division/ Laboratory	Supervisor	Role of Partner Organisation
Beneficiary							
- NAME	UiT-The Arctic University of Norway	☑		Norway	Department of Language and Culture	Professor Marit Westergaard	
Partner Organisation							
- NAME	University of Cyprus	☑		Cyprus	Department of English Studies	Professor Kleanthes Grohmann	Hosting secondment

1.   EXCELLENCE

1.1   Quality and credibility of the research/innovation action

Introduction, state-of-the-art, objectives and overview of the action:

This project investigates the ways in which variation in the linguistic input leaves its footprint on the developmental trajectory of language growth and its final outcome. Through eliciting and examining acceptability judgments that target different domains of grammar, this project will foster a novel, three-way comparison across (i) *monolingual, bilingual, and bilectal speakers*, (ii) *different domains of grammar*, (iii) *varying developmental trajectories within the bilingual population*, including heritage speakers and L1 attriters. The combination of on-line (reaction times) and off-line (acceptability judgments on a Likert scale) measures will provide insights into the ways the various structures are processed by the human mind and elucidate whether bilingualism confers a cognitive advantage in this processing. This project brings together both the social and the neurological aspects of our ability to use language, through adopting a crosslinguistic approach to the investigation of language across populations with different trajectories. Ultimately, this project will generate substantive, empirically informed hypotheses about human language, which within the present context of globalization and increased multilingualism throughout the lifespan, are likely to achieve a marked scientific impact, being of interest to psycholinguists, sociolinguists, psychologists, and cognitive neuroscientists. Last, the emphasis given to non-standard languages promotes linguistic diversity, concordant with European Union's efforts to raise awareness about minority languages, thus the results will also inform educational policy makers.

The topic of language variation and how this informs our study of language are currently at the forefront of linguistic research. This is one of the few topics for which both linguists and cognitive neuroscientists agree that merits further attention. Representing the first area of research, very illuminating is the view of linguist Noam Chomsky who has repeatedly argued that in order to understand the capacity to use language, we need to know *what options it permits*.[1] With respect to the second area of research, addressing the Quo Vadis of present-day linguistics, cognitive neuroscientist Peter Hagoort devoted part of his plenary talk at the 47th meeting of the Linguistic Society of Europe on how linguistics, once viewed as a key player in the field of cognitive science, has seen its potential collaborations with neuroscientists not profit fully from its most recent findings over the last years.[2] The most important questions that arise in this context are (i) *why this is happening* and (ii) *whether there is a remedy for this situation*. With respect to (i), it seems to be the case that the reason is in part the way the topic of language variation has been approached over the last years. More specifically, discussing comparative syntax and the way parametric models capture variation,[3] Biberauer et al. (2014) argue that recent linguistic descriptions have achieved a high level of descriptive adequacy, *sacrificing though explanatory adequacy*, due to the postulation of more and more entities as part of our innate ability to acquire language.[4] Descriptions and observations over linguistic data offer observational adequacy, possibly descriptive adequacy, but *not* explanatory adequacy.[5] Explanatory adequacy is not the only thing sacrificed. The key role of linguistics within the larger field of cognitive science is also compromised due to absence of *shared context of justification*.[2] Fortunately, both linguists and neuroscientists find this state of affairs remediable.[6] Offering a remedy is one of the overall goals of this project.

Research objectives: The view of Peter Hagoort on how the context of justification is related to obtaining powerful data is illuminating: Running informal experiments is fine for discovering phenomena (*the context of discovery*), but it does not suffice as *the context of justification*, for which reliable empirical data have to be acquired.[2] In this context, **the first objective of this project is to develop a multi-levelled description of language variation and its deriving factors in a way that involves both the elicitation of novel data and their interpretation within a context of justification that brings together insights from both linguistics and closely allied disciplines, thus effectively creating interdisciplinary bridges between linguistics and the greater field of neurocognition**.

Constructing interdisciplinary bridges of that type is not a trivial task. However, it is a highly rewarding task because in doing so we obtain a picture of our innate endowment for language (Universal Grammar, according to generative linguists)[7] that is easier to work from an evolutionary point of view, taking into consideration the narrow time window for evolution. In other words, in the task of pursuing interdisciplinary work, the topic of language variation will be approached from a bottom-up perspective through asking how little we can ascribe to

[1] Chomsky, N. 2015. An interview on linguistic variation with Noam Chomsky. *Isogloss* 1(1), 143-145.

[2] Hagoort, P. 2014. Linguistics quo vadis? An outsider perspective. Talk at the *47th Annual Meeting of the SLE*, 11-14 September, Poznań, Poland.

[3] Chomsky, N. 1981. *Lectures on Government and Binding*. Dordrecht: Foris.

[4] Biberauer, T., A. Holmberg, I. Roberts & M. Sheehan. 2014. Complexity in comparative syntax: The view from modern parametric theory. In F. J. Newmeyer & L. B. Preston (eds.), *Measuring Grammatical Complexity*, 103-127. Oxford: Oxford University Press.

[5] Chomsky, N. 1965. *Aspects of the Theory of Syntax*. Cambridge, MA: MIT Press.

[6] Hornstein, N. 2015. The future of linguistics; two views. [http://facultyoflanguage.blogspot.com.es/2015/02/the-future-of-linguistics-two-views.html]

[7] Chomsky, N. 2005. Three factors in language design. *Linguistic Inquiry* 36, 1-22.

our innate state of 'language-readiness'. As Chomksy has argued, the task of accounting for the evolution of language would be significantly eased from a bottom-up approach to Universal Grammar (UG): for any structure, the less attributed to structure-specific factors for determining its development, the more feasible the study of its evolution.[8] More importantly, this bottom-up approach can overcome the '*Granularity Mismatch Problem*', according to which linguistic and neuroscientific studies of language operate with objects of different granularity in a way that makes the construction of interdisciplinary bridges difficult.[9] Our approach to variation will *not* rely to an overarticulated UG, following the suggestion of Di Sciullo et al. (2011) that our endowment for language specifies only a *few* computational *operations*.[10] This move is likely to bring linguistics to a more appropriate level of granularity for the purposes of formulating the linking hypotheses that Poeppel refers to in his discussion of the *mapping problem*: how to formulate the formal links between neurobiology and cognition.[11,12] In this context, **the second aim of the project is to offer and develop a three-step solution to Hagoort's and Poeppel's problems**: (1) Disentangle variation through teasing apart the different contributing factors responsible for deriving it in a way that does justice to sociolinguistic and neuro-/psycholinguistic aspects of language use. (2) Embed this theory of variation into a shared context of justification through obtaining reliable data from different groups, each of which contributes its own characteristics towards deriving variation. (3) Keep UG primitives to a minimum in order to effectively comply with principles of methodological economy (e.g., Occam's razor) and evolutionary constraints.

Another challenge for any approach to variation derives from the mainstream conception of the notion of *surface* variation (i.e. grammatical variation among speakers of the same language that is *not* the result of any acquired or developmental pathology) *within* a linguistic community. For example, Chomsky's idealized picture of a "completely homogeneous speech community" and an "ideal speaker-listener [...] who knows its language perfectly" is often coupled with the idea that adult performance is "essentially homogeneous with that of the surrounding community" unless a pathology is present.[13] Idealizations like these, although theoretically well-argued in their original context, when translated in empirical terms, paint a picture that is directly related both to Hagoort's and Poeppel's problems and to the key objectives of the DIVA project. To be more precise, by not doing justice to the patterns of surface variation that are attested in reality, theoretical linguistics may *lose a significant part of its potential interactions* with fields that deal with language emergence, evolutionary linguistics, and sociolinguistics. Despite what the idealized picture suggests, *variation can be found even in the absence of any pathology, even among speakers of the same language, even within a speaker past the acquisition period*. Charles Yang phrases this observation in the following way: "Adult speakers, at the terminal state of language acquisition, may retain multiple grammars, or more precisely, alternate parameter values [...] *It is often suggested that the individual variation is **incompatible** with the Chomskyan generative program*".[14] Similarly, in the case of language emergence de novo, fieldwork has shown that not only is the development of grammatical markers subject to environmental factors (e.g., time, distribution of speakers/signers), but also great grammatical fluidity is attested, as points of variation ('parameters' in generative terms) are not fixed, resulting in realization of alternate values both within and across speakers of the *same* language.[15,16] Evidently, not all linguistic communities are homogeneous and this variation often goes well beyond bi- or multilingualism. It has been repeatedly shown that ***non-standard varieties are more fluid***, and that standardization itself is what leads to more clear-cut grammatical variants.[17,18]

Although Yang correctly observes the existence of inter- and intra-speaker variation past the terminal state, **the third goal of DIVA is to show that this variation *is* in fact compatible with the generative program and, more specifically, with one of its main pillars: UG**. Put another way, the aim is to revisit some UG primitives, *not* the concept of UG per se. Thus, DIVA will frame its findings within a generative approach, coupled with *a minimal conception of UG that is compatible with the surface variation* that Yang describes. This conception of UG is the third component of the aforementioned three-step solution to Hagoort's and Poeppel's problems. The reasons for choosing this conception of UG as the context of interpretation are documented in previous work of both the Experienced Researcher, Dr. Evelina Leivada and the Supervisor, Professor Marit Westergaard.[12,19,20,21,22]

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[8] Chomsky, N. 2007. Approaching UG from below. In U. Sauerland & H.-M. Gärtner (eds.), *Interfaces + Recursion = Language?*, 1-29. Berlin: de Gruyter.

[9] Poeppel, D. & D. Embick. 2005. Defining the relation between linguistics and neuroscience. In A. Cutler (ed.), *Twenty-First Century Psycholinguistics: Four Cornerstones*, 103-118. Mahwah, NJ: Lawrence Erlbaum.

[10] Di Sciullo, A. M., M. Piattelli-Palmarini, K. Wexler et al. 2010. The biological nature of human language. *Biolinguistics* 4(1), 4-34.

[11] Poeppel, D. 2012. The maps problem and the mapping problem. *Cognitive Neuropsychology* 29(1-2), 34-55.

[12] Leivada, E. 2015. *The Nature and Limits of Variation across Languages and Pathologies*. Doctoral dissertation: Universitat de Barcelona.

[13] Anderson S. R. & D. W. Lightfoot. 1999. The human language faculty as an organ. *Annual Review of Physiology* 62, 697-722.

[14] Yang, C. 2004. Toward a theory of language growth. In L. Jenkins (ed), *Variation and Universals in Biolinguistics*, 37-56. Amsterdam: Elsevier.

[15] Washabaugh, W. 1986. *Five Fingers for Survival: Deaf Sign Language in the Caribbean*. Ann Arbor, MI: Karoma Press.

[16] Sandler, W., I. Meir, S. Dachkovsky, et al. 2011. The emergence of complexity in prosody and syntax. *Lingua* 121, 2014-2033.

[17] Cheshire, J. & D. Stein, D. 1997. *Taming the Vernacular: From Dialect to Written Language*. Harlow: Longman.

[18] Henry, A. 2005. Non-standard dialects and linguistic data. *Lingua* 115, 1599-1617.

[19] Boeckx, C. & E. Leivada. 2013. Entangled parametric hierarchies: Problems for an overspecified Universal Grammar. *PLOS ONE* 8, e72357.

[20] Boeckx, C. & E. Leivada. 2014. On the particulars of Universal Grammar: Implications for acquisition. *Language Sciences* 46, 189-198.

[21] Westergaard, M. 2014. Linguistic variation and micro-cues in first language acquisition. *Linguistic Variation* 14, 26-45..

[22] Westergaard, M. 2009. *The Acquisition of Word Order: Micro-cues, Information Structure, and Economy*. Amsterdam: John Benjamins.

More specifically, Dr. Leivada's computational approach to parametric hierarchies has shown that it is not feasible to describe variation in terms of UG parameters.[12,19] Westergaard's data demonstrated that variation is best described through the micro-cues model and not UG parameters, resulting to "relatively restricted UG".[22] Using different types of approaches and data, Westergaard and Leivada independently arrived at the same conception of UG; the latter will be a key component of the context of interpretation in which DIVA's findings will be embedded.

It is vital that this conception of the human language-readiness is accompanied by data that encompass not only different domains of grammar and different languages, but also different groups of speakers in terms of the *differential input effects* that inform and affect their linguistic development. To explain this further, it is now widely accepted that bilingualism confers a cognitive advantage that persists throughout the lifetime.[23] Given that 'bilingualism' is a cover term that hosts different populations, different *types* of bilinguals must be tested in order to elucidate this cognitive advantage. When one aims to offer a multi-levelled approach to language variation, the contribution of different trajectories to the bilingual mind must be investigated. For example, only very recently it has been shown that the cognitive benefits of bilingualism are also observed in people that speak two very closely related varieties of the same language (i.e. bilectals) and not two different languages.[24] Examining different language groups, *each of which is endowed with unique sociolinguistic features*, is important for developing a theory of how variation in the input affects the ultimate linguistic attainment of adult speakers.

Norbert Hornstein recently talked about the importance of crucial experiments in linguistics.[25] He argued that theoretical discussions or debates often come to an end when an experiment produces what he calls '**killer data**'. DIVA aims to collect such data for language variation and the bilingual mind. By pursing a three-way comparison across lingualities, domains of grammar, and developmental trajectories within the bilingual population, DIVA will establish **comparative profiles** that will enable us to understand *how* variation in the input affects speakers' linguistic perception and development.

Research methodology and approach

Research questions: The vehicle through which DIVA will achieve its goals are acceptability judgment tasks, which have been shown to be a reliable tool in linguistic research.[26] Equally well established is the idea that acceptability judgments should be viewed as points on a spectrum.[27] Crucially, their position on the spectrum is affected by factors such as grammatical fluidity, pragmatic context, and sociolinguistic norms. Assuming that UG does not dictate the relevant orderings of grammatical elements for reasons discussed in Chomsky (2007) and more recently in Leivada (2015),[8,12] **the input effects have to be investigated for the surfacing patterns of variation to be fully understood**. In this context, the three clusters of questions behind this project are the following:

1. Is the 'gray area'[27] of partial acceptability bigger in bilingual populations compared to monolingual ones? Are there differences between different types of bilinguals (i.e. bilectals, heritage speakers, L1 attriters)?

2. Is it possible to find greater interspeaker variation in the judgments of the bilingual populations?

3. Is the cognitive benefit of bilingualism/bilectalism of aid when speakers are asked to evaluate the well-formedness of grammatical illusions, that is, sentences that confuse the parser in a way that renders high acceptability rates even if the stimuli is unacceptable (e.g. 'More people have been to Tromsø than I have')?

Obtaining answers to these questions is *necessary for achieving the aforementioned objectives of DIVA*: (i) a multi-levelled description of variation, (ii) the interdisciplinary bridges that offer a solution to Hagoort's and Poeppel's problems and (iii) a productively shared context of justification that merges sociolinguistic and neurolinguistic factors in explaining the cognitive benefits of bilingualism in neurotypical populations.

Participants: Three groups of 30 participants each will be tested: (i) bilingual speakers of a Scandinavian language (Norwegian, Swedish, Danish) and Standard Greek recruited in Scandinavia, (ii) bilectal speakers of Standard Greek and Cypriot Greek recruited in Cyprus during the secondment phase, and (iii) monolingual speakers of Standard Greek recruited in Greece during a short visit for fieldwork at the secondment phase. Different work packages, presented in section 3, are linked to the different rounds of testing in terms of populations. The number of participants is calculated so as to ensure statistical power over the results.

The first group will be divided into two subgroups: (i) 15 heritage speakers of Standard Greek that were born and educated in Scandinavia and got exposed to Standard Greek in the home environment, and (ii) 15 L1 attriters that were born and educated in Greece, and got exposed to the Scandinavian language during adulthood. Participants in this last subgroup should have spent at least 7 years in Scandinavia in order to ensure adequate exposure to Scandinavian (following previous work on Swedish-Standard Greek bilinguals carried out by members

[23] Bialystok, E., C. McBride-Chang & G. Luk. 2005. Bilingualism, language proficiency, and learning to read in two writing systems. *Journal of Educational Psychology* 97, 580-590.

[24] Antoniou, K., K. K. Grohmann, et al. 2016. The effect of childhood bilectalism and multilingualism on executive control. *Cognition* 149, 18-30.

[25] Hornstein, N. 2016. Crucial experiments and killer data. [http://facultyoflanguage.blogspot.com.es/2016/05/crucial-experiments-and-killer-data.htm]

[26] Sprouse, J. & D. Almeida. 2012. Assessing the reliability of textbook data in syntax. *Journal of Linguistics* 48, 609-652.

[27] Sprouse, J. 2007. Continuous acceptability, categorical grammaticality, and experimental syntax. *Biolinguistics* 1, 123-134.

of the host institution in Norway).[28] Bilinguals, including heritage language learners, are native speakers too; bilingualism and nativeness are not mutually exclusive notions.[29] Dr. Leivada **has already been involved in recruiting participants for a different linguistic task in Norway, Sweden and Denmark**. In 2016, she ran a variety judgment task (i.e. test stimuli involved different types of dialectal elements superimposed on otherwise standard utterances and participants were asked to judge utterances as standard or dialectal) to heritage speakers of Standard Greek that acquire their first language in Scandinavia as well as L1 attriters of Standard Greek and a Scandinavian language.[30] Dr. Leivada has successfully recruited more than 50 speakers from Scandinavia in two months through an online platform (LimeSurvey). Valuable contacts with Greek schools, embassies and communities in Norway, Sweden and Denmark have already been made and no risks in participant recruitment are anticipated during the fellowship. Dr. Leivada is aware of the heterogeneity of the groups in terms of different languages, times of onset, and developmental trajectories. The results will be carefully analyzed taking the 'heterogeneity' factor into account in order to uncover any systematic patterns of performance across or within groups. All testing will be carried out in Standard Greek. Bilectals will be tested in both varieties of Greek in order to better flesh out the **sociolinguistic factors** that affect their performance. Dr. Leivada is a native speaker of Standard Greek and near-native in Cypriot Greek. The mean age of participants will be 30-40 years.

All participants will be literate adults that have completed secondary education in Scandinavia, Cyprus or Greece, depending on the group. Participants from Greece will be recruited in collaboration with colleagues (Prof. Arhonto Terzi) at the Technological Educational Institute of Western Greece. Since we seek to test neurotypical populations, all participants will be asked to report whether they have a history of neurological or behavioral problems as well as any speech-pathology treatment. Exclusion criteria will include absence of normal articulation, hearing, and (corrected-to-)normal vision, a history of language delay, neurological problems or evidence of brain injury, and gross motor difficulties. All efforts will be made to ensure a **gender balance in participants**, although findings from previous research on acceptability judgments in bilinguals *did not indicate a difference between male and female participants*.[31]

Baseline tasks: All participants will complete the Raven's Standard Matrices as a baseline for non-verbal abilities.[32] Bilingual and bilectal participants will also complete the bilingual language proficiency checklist of Li et al. (2006) in order to assess competence in their various languages.[33]

Tasks: Three experiments will be developed, each of which will involve a task that targets a different domain of grammar: (i) S(ubject)-V(erb)-O(bject) variation, (ii) adjective orderings, and (iii) grammatical illusions.

The first task deals with SVO orderings. The languages under examination differ in terms of their flexibility in this domain. In main clauses, Norwegian, Swedish, and Danish are V2: the finite verb appears in the second position. Standard Greek and Cypriot Greek are flexible and both vary in the placement of the subject pre-verbally (SVO) or post-verbally (VSO), depending on whether new or old information is encoded.[34,35] Equally well-established is the idea that VOS in Standard Greek is always rendered with focus.[36] In this first experiment, an on-line acceptability judgment task will test all six SVO combinations in main clauses without any focused constituents. Participants will judge the acceptability of these combinations on a 5-point Likert scale: good (5), somewhat good (4), neither good, nor bad (3), somewhat bad (2), and bad (1). Reaction times will be measured in all groups. There are two reasons that make the comparison between monolinguals, bilinguals, and bilectals crucial. The first reason is due to the status of Cypriot Greek as a non-official-/-standard language. Absence of standardization leads to increased fluidity, which may result to more variable grammaticality judgments.[17,18] The second reason is that, contrary to what happens in Standard Greek, in Cypriot Greek, VOS is judged as the unmarked option.[31] In this context, the prediction is that bilinguals will perform better than bilectals because factors like grammatical fluidity and mesolectal variation are part of the repertoire of the latter, but not of the former.

The second task will tackle adjective orderings. During this phase, an on-line experiment will be run with the objective to identify if some orders are more preferred than others and which orders are really unacceptable versus simply less preferred than others. This will happen through administering a task that targets adjective orderings to speakers of different languages (Norwegian, Swedish, Danish, Standard Greek and Cypriot Greek); the same participants as in the first task. Participants will be introduced to an acceptable sentence that will

[28] Kaltsa, M. I.-M. Tsimpli & J. Rothman. 2015. Exploring the source of differences and similarities in L1 attrition and heritage speaker competence: Evidence from pronominal resolution. *Lingua* 164, 266-288.

[29] Rothman, J. & J. Treffers-Daller. 2014. A prolegomenon to the construct of the native speaker. *Applied Linguistics* 35, 93-98.

[30] Leivada, E., M. Kambanaros & K. K. Grohmann. Submitted. The input of bilingualism and non-standardization in a variety-judgment task.

[31] Papadopoulou, E., E. Leivada & N. Pavlou. 2014. Acceptability judgments in bilectal populations. *Linguistic Variation* 14(1), 109-128.

[32] Raven, J., J. C. Raven & J. H. Court. 2003. *Manual for Raven's Progressive Matrices and Vocabulary Scales. Section 1*. San Antonio, TX: Harcourt.

[33] Li, P., S. Sepanski & X. Zhao. 2006. Language history questionnaire. *Behavior Research Methods* 38 (2), 202-210.

[34] Alexiadou, A. 2000. Some remarks on word order and information structure in Romance and Greek. *ZAS Papers in Linguistics* 20, 119-136.

[35] Roussou, A. & I.-M. Tsimpli. 2006. On Greek VSO again!. *Journal of Linguistics* 42, 317-354.

[36] Spyropoulos, V. & A. Revithiadou. 2009. Subject chains in Greek and PF processing. In C. J. Halpert, J. Hartman & D. Hill (eds.), *Proceedings of the 2007 Workshop on Greek Syntax and Semantics at MIT*, 293-309. Cambridge, MA: MWPL.

be given the highest rating, then asked to rate the stimuli on a 5-point Likert scale. It is worth noting that the judgments reported in that literature do not seem to account for the patterns of variation that are attested in reality. For example, it has been suggested that size precedes color crosslinguistically (e.g., the big red car),[37,38] and Standard Greek was argued to adhere to this pattern.[39] However, a search among native speakers of Standard Greek suggests that the unmarked order is not uniform. Importantly, most of the literature deals exclusively with monolingual speakers. Observing that some variation is attested even in monolingual speakers, the prediction is that a greater degree of variation and flexibility will be attested in binguls and bilectals, especially when one of their languages is non-standard. This issue is directly related to our conception of UG, since it has been repeatedly argued that *there is a universal hierarchy for adjective placement*.[40,41,42] In this context, the results of this second task will make two novel contributions. First, they will show whether bilingualism and non-standardization affect the flexibility of the orderings. Second, they will pave the way for dealing with ordering constraints in a way that does justice to the attested variation, *without* assuming that the relevant hierarchies are encoded in UG. A UG-imposed rigid order for adjective placement is not able to explain why inter- and intra-speaker variation arises in this domain of grammar.

In the third task, the domain of investigation is the phenomenon of grammatical illusions. These sentences confuse the parser in a way that renders high acceptability rates even if the stimuli are problematic (1).

(1) More people have been to Tromsø than I have.

Although these sentences are perceived as acceptable, upon closer reflection, speakers understand that they are incoherent.[43] *Grammatical illusions provide a unique opportunity to put the cognitive advantage of bilingualism to test*. The underlying hypothesis is that perhaps due to this advantage, the bilingual population would be better than the monolingual one in spotting the illusion and give it a low rating. Preliminary findings from a pilot study run by Dr. Leivada in bilectal speakers of Standard and Cypriot Greek suggest indeed that the bilectal group *performed better* in the variety acquired at home compared to their monolingual peers in Greece.[44] Of course, these are preliminary results that have targeted only one type of grammatical illusion (i.e. with a repeatable predicate). A full task has to be developed for the comparisons across monolinguals and bilinguals to be robust and reliable. Once more, reaction times will be measured when participants are asked to rate sentences.

All tasks will be administered through E-Prime v2.0, a suite of applications to develop, publish, and collect responses to on-line and off-line surveys. E-Prime provides millisecond precision timing to ensure data accuracy and this guarantees that reaction times are not subject to any interference from external noise. Measuring reaction times is an important part of all tasks, therefore testing will always take place in the presence of Dr. Leivada, in a quiet room, using the same equipment and program across countries/groups of testing.

All in all, the DIVA project will explore the nature of the language faculty in terms of how variation in the input affects the linguistic performance of adult monolingual and bilingual speakers. This research will adopt an interdisciplinary perspective that will interpret its findings without assuming that much of the attested patterns derive from UG-encoded primitives. As such, it is likely to provide answers to the why-questions of linguistics (i.e. why does our language have these properties?), recently voiced in Chomsky (2011).[45] Addressing this type of questions, through obtaining reliable data and interpreting them *without* assuming that the answer is to be found in a structurally-rich UG that dictates all the relevant orderings, would be a step in the direction that in Chomsky's (2011) words "**ha[s] only barely been explored**" and a **solution to Hagoort's and Poeppel's problems**.

Originality and innovative aspects of the research programme
The first innovative aspect of DIVA lies in its methodology and, more specifically, in its **three-way comparative method** that spans (i) lingualities, (ii) domains of grammar, and (iii) developmental trajectories. Thanks to this previously untested combination, comparative profiles will be established with the aim to approach language variation in a way that tackles long lasting problems in linguistics, such as the *Granularity Mismatch Problem*. The

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[37] Scott, G.-J. 2002. Stacked adjectival modification and the structure of nominal phrases. In G. Cinque (ed.), *Functional Structure in DP and IP: The Cartography of Syntactic Structures*, 91-116. Oxford: Oxford University Press.

[38] Svenonius, P. 2008. The position of adjectives and other phrasal modifiers in the decomposition of DP. In L. McNally & C. Kennedy (eds.), *Adjectives and Adverbs: Syntax, Semantics, and Discourse*, 16-42. Oxford: Oxford University Press.

[39] Alexiadou, A. 2003. Adjective syntax and (the absence of) noun raising in the DP. *UCLA Working Papers in Linguistics* 10, 1-39.

[40] Sproat, R. & C. Shih. 1991. The cross-linguistic distribution of adjective ordering restrictions. In C. Georgopoulos & R. Ishihara (eds.), *Interdisciplinary Approaches to Language*, 565-593. Dordrecht: Kluwer Academic Publishers.

[41] Crisma, P. 1990. Functional categories inside the noun phrase. Master thesis, University of Venice.

[42] Cinque, G. 1994. On the evidence for partial N-movement in the Romance DP. In G. Cinque, J. Koster, J.-Y. Pollock, L. Rizzi & R. Zanuttini (eds.), *Paths Towards Universal Grammar*, 85-110. Washington, DC: Georgetown University Press.

[43] Wellwood, A., R. Pancheva, V. Hacquard & C. Phillips. 2015. The anatomy of a comparative illusion. Unpublished ms. under revision.

[44] Leivada, E. 2016. A crosslinguistic investigation of bilingualism and non-standardization. Talk delivered at the LAVA seminar, UIT [3 June 2016].

[45] Chomsky, N. 2011. Language and the cognitive science revolution(s). Lecture given at the Carleton University [8 April 2011].

second innovative characteristic of this project boils down to the language groups that will be tested. **Cypriot Greek is a largely understudied language** that lacks official codification and the status of an official language. The linguistic reality of Cyprus is diglossic between the local variety of Cypriot Greek and the official language, Standard Greek. As a result, the target population in Cyprus is a bilectal population that speaks two varieties of the same language. Due to a cluster of factors, the documentation of the linguistic profile of this population has only recently started to be developed in a systematic fashion. Third, bilingual speakers of Standard Greek and Swedish have been tested in the past,[28] but this project will be **the first one** to recruit bilingual speakers of Standard Greek and Norwegian or Danish, thus creating a **novel network for enhanced cooperation between linguistic communities across 5 European countries** (Norway, Sweden, Denmark, Cyprus and Greece). Last, the topic of grammatical illusions and the potentially differential performance of bilinguals in spotting the illusion **have never been addressed so far**, apart from a pilot study with bilectals run by Dr. Leivada. As the outcome of the interaction of all these factors, the end result of DIVA will be an innovative, multi-levelled account of language variation that transcends the boundaries of different languages or different disciplines.

The interdisciplinary aspects of the action
DIVA is interdisciplinary in two ways: first, in relation to **its object of study** and second, in terms of its **methodology**. With respect to the former, DIVA deals with aspects of the language faculty in the bilingual mind. Eric Lenneberg chose to open his seminal 1967 book about the biological basis of language with stressing precisely how research about language and its development is *eo ipso* interdisciplinary.[46] In his words, "the study of language is pertinent to many fields of inquiry. […] It encroaches upon the humanities, as well as upon the social and natural sciences" (p. vii). With respect to its methodology, the interdisciplinary character of DIVA lies in combining theoretical notions and empirical methods of psycholinguistics, theoretical linguistics, cognitive neuroscience, and language pathology. More specifically, **(i)** the design of the experiments will incorporate insights from theoretical linguistics and psycholinguistics in relation to the grammatical status of the three phenomena under investigation, **(ii)** the results will be interpreted taking into consideration current trends in cognitive neuroscience and Hagoort's urge to embed findings into a productively shared context of justification (for instance, by avoiding the postulation of ad hoc linguistic primitives such as a parameter that determines headedness patterns in SVO orderings or a UG-imposed order that specifies adjective distribution), and **(iii)** participant recruitment will be conducted according to the standards employed in clinical linguistics, thoroughly checking the linguistic background of speakers and seeking the expert opinion of speech pathologists about the exclusion criteria.

Best career possibilities for the ER and new collaboration opportunities for the host organisation(s)
The fellowship will be very beneficial for Dr. Leivada in terms of the collaboration opportunities available at the host institution, *UiT-The Arctic University of Norway* (UiT), and the UiT-based research lab '*Language Acquisition, Variation and Attrition*' (LAVA) headed by the Supervisor, Prof. Westergaard. DIVA will connect different research agendas on language variation, effectively relating research labs in Norway, Cyprus and Greece, **in a way that positions the ER and the host institution in the central position of a new network**. The CV of Dr. Leivada demonstrates a level of interdisciplinarity and diversity that fits perfectly the domain of expertise of LAVA members on variation and bilingualism. This match offers fertile ground for collaborative work across projects. The host institution will benefit from DIVA, as research on language combinations that have *never* been tested so far will open a new domain of investigation at UiT, likely to attract the interest of future researchers. This would result in a **new round of international collaborations, promoting mobility across European countries in the long run**. Dr. Leivada's **secondment** at the University of Cyprus and the lab Cyprus Acquisition Team (CAT; directed by Prof. Kleanthes Grohmann) will aid the transfer of knowledge **across labs** (LAVA and CAT), establishing new research connections among them. As for the Dr. Leivada, undoubtedly joining UiT will be the great step forward for her, specifically so in **(i)** gaining valuable expertise in conducting experiments across various populations, **(ii)** working with leading researchers in the field of bilingualism, variation, heritage language learning, and attrition, **(iii)** profiting from excellent networking possibilities at an international level, and **(iv)** building the basis on which her future research on language variation will be developed.

1.2   Quality and appropriateness of the training and of the two-way transfer of knowledge between the researcher and the host
Scientific training: Joining UiT, Dr. Leivada will be able to build on her current approach on language variation by undertaking experiment-based research, while **being trained in using different experimental techniques by leading experts of the field**. Second, the existence of **cutting-edge facilities for psycholinguistic research and related seminars on their use** will provide Dr. Leivada with the means to receive advanced training in

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[46] Lenneberg, E. H. 1967. *Biological Foundations of Language*. New York: John Wiley.

psycholinguistic methods during the fellowship. Third, she will become a member of the Center for Advanced Study in Theoretical Linguistics (CASTL), a Norwegian *Center of Excellence*, benefiting from collaborations with world-renowned theoretical linguists (Gillian Ramchand, Peter Svenonius). Fourth, she will receive **complementary training** in people and time management, networking, fund raising, grant application writing, using social media for career enhancement, and working towards a successful career in academia, through being involved in the dedicated venues at the host institution, such as the *Arctic MSCA-IF Symposium*, which she already attended in 2016. Last, the **secondment** at the University of Cyprus will train Dr. Leivada **to create and maintain international research networks,** promoting cross-institutional research in the European community.

Transferable training: Dr. Leivada will use the training she receives to inform future generations of researchers. She will organize a weekly **reading group** mainly addressed to the (post)doctoral students of the host institution, also during her secondment in Cyprus, with the aim to familiarize students with different experimental techniques and topics related to language variation. Moreover, she will supervise short research visits of doctoral researchers from Cyprus in Norway, reinforcing institutional mobility among young researchers. Also, having attended the 2016 *Arctic MSCA-IF Symposium* at UiT, which aimed to train researchers to prepare successful proposals, she will participate in the forthcoming symposia with a different role. She will present her own experience to researchers preparing for future rounds of applications, **thus making an active contribution towards transferable training within academia.** With respect to the end result, all the tasks that DIVA will generate will be made freely available to the scientific community after the end of the fellowship. Dr. Leivada will remain available for handling requests for information after the completion of DIVA, in order to reach **the project's objective of transferable knowledge in terms of the end result**.

Two-way transfer and benefits for the host institution: The findings of DIVA will offer novel insights into bilingual development; **a key topic of the research agenda of UiT scholars and, as such, a promising basis for a two-way transfer of knowledge between the ER and the host**. Second, Dr. Leivada will apply her expertise in experimental syntax in training students at UiT to carry out linguistic experiments using various elicitation techniques, designing novel tasks, and analyzing data. Moreover, she will supervise students in projects and final year dissertations in topics related to her expertise. Last, thanks to this synergistic initiative and the thriving environment UiT offers, both Dr. Leivada and the host institution will be placed in the centre of a new research network that will promote international **co-operation and mobility in Europe**, resulting in enhanced research ties among European countries, thereby opening new research opportunities for future generations of researchers.

1.3   Quality of the supervision and of the integration in the team/institution

Qualifications and experience of the supervisor: Marit Westergaard is Professor of Linguistics at UiT and also holds a 20% professorship at The Norwegian University of Science and Technology (NTNU, Trondheim). Prof. Westergaard is one of the world's leading scholars in the field of language variation and multilingualism, with a high number of international publications. She has supervised 23 MA theses (plus 4 in progress), 7 doctoral dissertations (plus 3 in progress) and a number of guest PhD students/post-docs at UiT. In recent years, she has developed the Micro-Cue Model of language acquisition, which combines insights from both of the leading theories in the field, generativism and constructionism, and argues that acquisition is not the result of early major generalizations, but takes place in small but discrete steps. This model is currently being developed for multilingual situations, especially within the project MiMS (Micro-variation in Multilingual Acquisition & Attrition Situations), funded by the Research Council of Norway. Prof. Westergaard has extensive leadership experience, as the Director of CASTL, funded by the Research Council of Norway as a *Center of Excellence*. Currently, she is the leader of the research group LAVA, which Dr. Leivada will join. The LAVA group runs the *TROmsø Language Acquisition Lab* (TROLL), producing cutting-edge research based on corpora and experimental data, mainly elicited production and eye-tracking; facilities that will be made available to Dr. Leivada and considerably aid her training and professional development. During the secondment, Dr. Leivada will be co-supervised by Prof. Grohmann, who has a strong agenda in the field of variation, having participated in 12 national and international projects, including 2 COST Actions funded by the EU, on language development of speakers of non-standard varieties.

Hosting arrangements: The diverse institutes and research groups of UiT provide multi-faceted assistance to foreign researchers. This fellowship will enable Dr. Leivada to join LAVA, one of the most prolific labs devoted to the study of language variation, attrition and heritage language learning. The structure of both LAVA and CASTL offers unique opportunities for collaboration with specialists in different fields of linguistics. Thanks to the structure of these labs, Dr. Leivada will be well integrated in the research life of UiT, attending weekly lab meetings and supervisory meetings, seminars organized by the TROLL lab, and all outreach activities of the Department of Language and Culture. With respect to outreach activities, Dr. Leivada will join Prof. Westergaard and LAVA members in communicating research to a general audience through the web service *Flere språk til flere*, a branch of the international network *Bilingualism Matters*, **thus fully profiting from the international networking opportunities that the host offers**. During the secondment, Dr. Leivada will be offered all necessary

assistance and co-supervision by Prof. Grohmann, at the CAT lab. Her strong connections with CAT, as a founding member since 2009, ensure her immediate integration in the institution that will host the secondment.

1.4 Capacity of the researcher to reach or re-enforce a position of professional maturity

Dr. Leivada has a publication record that demonstrates the ability to conduct research both at a theoretical and an experimental level, as evidenced by her publications in *PLOS ONE*, *Neuroscience Letters, Lingua*, *Journal of Neurolinguistics*, *Biolinguistics*, *Frontiers in Human Neuroscience* and *Linguistic Variation* as well as in a variety of edited volumes. At the present stage of professional development, the fellowship will considerably increase her competences at both these levels. Dr. Leivada has successfully used the training she received during her graduate studies in designing and carrying out five different experiments in the fields of language variation and acquisition. During the fellowship, Dr. Leivada will acquire skills that are indispensable for reaching a position of field-leading professional development. Since UiT is the home of academics with excellent expertise in language development across different language groups, it offers an ideal interdisciplinary environment for fostering DIVA. This environment will enable Dr. Leivada to further **develop her training in psycholinguistic methods and enhance her management skills**, not only by attending the relevant seminars that are available in Tromsø, but also in practice, by managing this project, supervising its smooth implementation, and organizing an **international workshop** for disseminating DIVA's results, including a session for dialect variation that will **promote awareness about the marginalization of non-standard varieties and minority languages**.

2. IMPACT

2.1 *Enhancing the potential and future career prospects of the researcher*

Dr. Leivada's long-term aim is to apply the training gained during the fellowship towards securing an ERC Grant from the European Research Council, creating her own research team on language variation and bilingual development. Demonstrating the ability to receive a prestigious post-doctoral fellowship at this stage will both enhance her research-related skills and maximize her chances for obtaining an advanced research position after the fellowship ends. Since DIVA involves crosslinguistic research **across European countries**, it is likely that this research will establish **collaboration ties** that will prove useful for her future career. A key characteristic of Dr. Leivada's past and present work is her interest in marginalized, understudied, non-codified dialects. The fellowship will allow her to continue promoting awareness on these matters in her future career. Conducting research in Cypriot Greek, a non-official language spoken within the European Union (EU) is concordant with EU's goal to promote linguistic diversity and awareness of minority and regional languages. Research in Cypriot Greek is thus vital within the EU, and putting the findings of this research in perspective with findings obtained from other languages is equally vital because it will create research connections that may encourage future generations of researchers to undertake research in minority languages, **creating a solid, future career network** for Dr. Leivada. Moreover, since LAVA has a strong research agenda also in the field of child language development, this project will give her the opportunity to expand her current expertise in child populations through co-supervising undergraduate students along with Prof. Westergaard. UiT provides a unique research environment for the development of Dr. Leivada, offering collaborations with Prof. Westergaard and experts in dialect variation (Prof. Øystein Vangsnes), L1 attrition and heritage speakers of Greek (Prof. Jason Rothman), word-order variation (Prof. Merete Anderssen) and UG primitives (Prof. Terje Lohndal). Beyond doubt, **this experience will be a great step forward for Dr. Leivada**, specifically so in building the basis on which her future research will be developed. In sum, the Marie Curie fellowship is absolutely coherent with Dr. Leivada's past achievements and is vital for her long-term career development within the European society.

2.2 *Quality of the proposed measures to exploit and disseminate the action results*

Dissemination: The findings of DIVA will be made available to both academics and the general public at a national and international level. Local partners, including (psycho)linguists, psychologists, neuroscientists and speech pathologists, will be informed through **internal seminars and reading group** meetings at UiT. Dr. Leivada will create a **webpage** dedicated to the activities of DIVA in order to attract international attention. She will also create a Facebook and a Twitter account which will provide news about the project's aims and progress, Marie Curie Actions, and more generally, research activities, also in relation to other projects that deal with language variation and the bilingual mind. All efforts will be made to highlight the importance of carrying out research in non-standard and minority languages. Aiming to reach a wide audience, comments will be welcome and all web presence of DIVA will be continuously monitored by Dr. Leivada across platforms. As part of the dissemination activities, Dr. Leivada will publish at least three **articles** in scientific journals of high visibility (e.g., *Cognition, Language Variation and Change*) and give talks at various **conferences** dedicated to bilingualism (e.g., the International Symposium on Bilingualism). Moreover, a **workshop** will be organized at UiT for the dissemination of the findings of DIVA. As part of the outreach activities, the project will be presented to the public through the

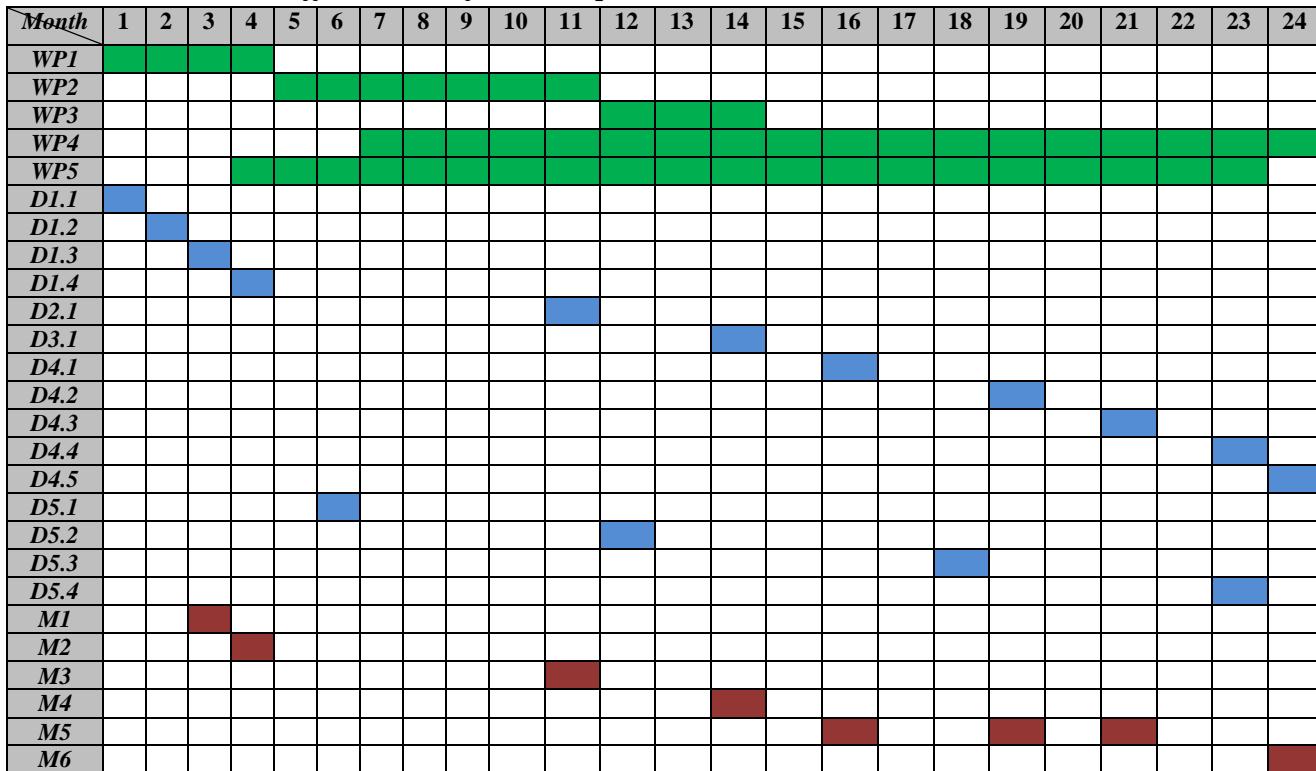UiT platform *Flere språk til flere*, a branch of *Bilingualism Matters*, run by Prof. Antonella Sorace.

Exploitation: DIVA will generate (i) a unique **dataset** to become available through a dedicated repository for linguistic data (TrolLing) hosted by the UiT library, (ii) **novel language tasks** to be diffused to the academic community through the ESRC funded Instruments for Research into Second Language Learning (IRIS) database, and (iii) a **blog** dedicated to offering concrete examples of how studying non-standard varieties has led to changes in educational policies and in what ways such changes were beneficial for the society. For (iii), Dr. Leivada will join *The Network to Promote Linguistic Diversity*, a European-wide network working in the field of language policy and planning for Constitutional, Regional and Small-State Languages across Europe. Throughout all phases of research, including the dissemination and exploitation of results, Dr. Leivada will be responsible for data management, dealing with quality issues and the final delivery of data for sharing or archiving. **Copyright and intellectual property ownership** of the data will belong to Dr. Leivada. Throughout the fellowship, **all confidentiality obligations** will be met according to the MSC Action Rules. Participants will provide written consent prior to their inclusion to the study. All data will be gathered and guarded solely for the purposes of the research outlined in the present proposal. Dr. Leivada commits to guard the confidentiality of participants' identity.

2.3. Quality of the proposed measures to communicate the action activities to different target audiences

An important part of DIVA will concern outreach activities, and specifically communication initiatives directed to non-academic audiences that aim at (i) creating awareness of the importance of this research to society, (ii) raising awareness of Marie Curie Actions, and (iii) familiarizing non-specialist audiences with the action activities. In both the website and the blog created by Dr. Leivada, the progress of DIVA will be presented in a clear**, non-technical** way, making the findings accessible not only to scientists, but also to the general public. Moreover, Dr. Leivada will participate in *FameLab*, a communications competition designed to engage different audiences by breaking down science into short, non-technical presentations. If she wins at the national level, she will represent Norway in *FameLab International*, attracting attention on topics related to the objectives of DIVA.

3. QUALITY AND EFFICIENCY OF THE IMPLEMENTATION

3.1 Coherence and effectiveness of the work plan

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
WP1	█	█	█	█																				
WP2					█	█	█	█	█	█	█													
WP3												█	█	█										
WP4							█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█
WP5				█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	
D1.1	█																							
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DIVA consists of **5 Work Packages** (WPs). *WP1*: Task development and ethical approval (months 1-4, as per Gantt Chart), *WP2*: Recruitment, data collection, and coding of the results -- Scandinavia (months 5-11), *WP3*: Recruitment, data collection, and coding of the results -- Cyprus & Greece (months 12-14), *WP4*: Analysis, interpretation, dissemination, and exploitation of the results (months 7-24). *WP5*: Complementary training, progress monitoring, and continuous risk evaluation (months 4-23). ***Deliverables***: *D1.1*: task 1 finalized (end of month 1); *D1.2*: task 2 finalized (end of month 2); *D1.3*: task 3 finalized (end of month 3); *D1.4*: ethics approval obtained (end of month 4). *D2.1*: Participant recruitment, data collection, and coding in Scandinavia (end of month

11); *D3.1*: Secondment. Participant recruitment, data collection, and coding in Cyprus & Greece during the secondment phase (end of month 14). *D4.1*: Completion of Article 1: Analysis and interpretation of the results from Scandinavia (month 16; *D4.2*: Completion of Article 2: Analysis and interpretation of the results from Cyprus and Greece (month 19); *D4.3*: Completion of Article 3: Analysis and interpretation of comparative profiles across populations and their implications for the bilingual mind and the cognitive advantage of bilingualism (month 21). *D4.4*: workshop on language variation (month 23); *D4.5*: contract for editing a volume or a journal special issue on topic of the workshop (month 24). *D5.1*: Risk assessment: written progress report 1 (end of month 6); *D5.2*: Risk assessment: written progress report 2 (end of month 12); *D5.3*: Risk assessment: written progress report 3 (end of month 18); *D5.4*: Risk assessment: written progress report 4 (end of month 23). **Milestones**: *M1*: completion of experimental tasks, *M2*: ethical approval, *M3*: completion of data collection -- Scandinavia, *M4*: completion of data collection -- Cyprus & Greece, *M5*: Completion of Articles 1, 2, and 3; *M6*: Task uploading in the IRIS database and dataset uploading in the TrolLing repository.

3.2.   *Appropriateness of the allocation of tasks and resources*
All possible measures are taken to ensure timely progress and smooth implementation of the tasks. More time is allocated to the recruitment of Scandinavian participants, as shown by the comparison of WP2 to WP3, because of the nature of the different populations: Monolingual speakers of Standard Greek in Greece and bilectal speakers of Cypriot and Standard Greek in Cyprus are easy to find, whereas the recruitment of bilingual speakers of Scandinavian and Standard Greek is more time-consuming. Even though Dr. Leivada has already contacts with a pool of bilingual speakers from previous research, the amount of person-months allocated to participant recruitment and testing in Scandinavia has been calculated to include **considerably more time than necessary** in order to ensure that even if recruitment is delayed by any unpredictable circumstances, this will **not** affect the overall progress of DIVA. The amount of person-months allocated to communication and dissemination of the results has been calculated to allow enough time for acquisition of complementary training skills by Dr. Leivada through dedicated workshops/seminars at UiT. Special emphasis is given to **data management**. Data will be stored safely on the UiT server using password protected computers to ensure security. **Provisions for a secondment are made** in order to ensure that data from different groups are collected and coded using the same format. At the end of the fellowship, the tasks will be made available through dedicated e-platforms, enabling access to other researchers, maximising the contribution of DIVA to the society and thus reaching DIVA's objective of transferable knowledge.

3.3   *Appropriateness of the management structure and procedures, including risk management*
Progress will be monitored through weekly meetings between Dr. Leivada and Prof. Westergaard. Dr. Leivada will write progress reports every 6 months (as per WP5) so as to continuously monitor risk. Prof. Westergaard will provide constant help and supervision to Dr. Leivada across all WPs and Prof. Grohmann will co-supervise her during WP3. The research will be undertaken in compliance with UiT Health and Safety policies. The research finance office will oversee budget spending; Prof. Westergaard, Dr. Leivada, and the head of department will receive bimonthly financial reports for scrutiny. Having evaluated the action, **no risk** that may endanger progress is currently anticipated, although time-allocation measures have been taken in order to **prevent any delay** in participant recruitment from interfering with the general progress of the project. Dr. Leivada has maintained **strong contacts** from previous experiments in all countries of testing. No testing will take place without the written consent of the participants and the written approval of the Norwegian Centre for Research Data. Overall, there is no foreseeable discomfort involved with participating in DIVA due to the nature of the testing, which concerns only healthy, adult populations. The participants' **well-being** during testing will be ensured by short breaks. Dr. Leivada has experience in conducting experimental research across (a)typical adult populations.

3.4   *Appropriateness of the institutional environment (infrastructure)*
The entire infrastructure of the university (library, IT support, participation in scientific life of the university through colloquiums, infrastructure for the execution of workshops) will be made available to Dr. Leivada. She will have her own workroom and necessary equipment both at UiT and during the secondment. UiT's library is well equipped for Dr. Leivada's research. UiT provides an excellent range of training events for new research staff as well as a stimulating institutional environment. The unique lab infrastructure of UiT means that Dr. Leivada will receive training that is absolutely necessary for her professional development through having access to behavioural laboratories, clinic rooms for observation and recording facilities, IT maintenance and portable equipment which she can use in the different countries of testing. Additionally, she will be able to undertake Career Management seminars on project and time management and share her experience in future workshops dedicated to writing successful research proposals. Overall, the institutional environment is **highly appropriate** for the project both in terms of **infrastructure** and **research opportunities**.

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