

# What's on: Cultural Diversity and New Educational Approaches for Specific School Populations.

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## Abstract

*Education policy regarding the immigrant school population is of utmost importance for current scientific research in social sciences. Digital resources and assessment instruments are challenges in education and psychology research, demanding knowledge from school community to address specific traits of learning and academic achievement. The education of future generation should be conceived based on multicultural idea of existing different cognitive profiles that have different self-regulations in learning environments as language acquisition development process. Immigrant school population is frequently neglected by school management and become emergent the development of open educational resources, validated tools and digital materials. Method: This post-doctoral research is focused in the development of open repository of paper and digital resources for school education, particularly addressing educational approaches for Portuguese second language learners. In current empirical study we are assessing a large sample of immigrant students from public schools, aged between 8 and 17 years old, learning Portuguese as second language, with heterogeneous profiles, in Lisbon district, from several levels of education. The main goal is to determine learner's cognitive profiles in second language setting, and which common performances we can find between different home language speakers answering to 15 tests in the same circumstances. We believe that accurate evaluation tests can produce new changes in learning environments of linguistic minorities. Preliminary results will be discussed regarding three hypotheses about verbal behaviors in cognates, idiomatic utterances and verbal analogy tasks according to three variables: age, home language and exposure to second language. The variation of these predictors might have influence in cognitive and linguistic profiles. Additionally will be evaluated the reliability and difficulty of each task to provide a more psychometric sound measure than traditional other tools of assessment in national second*

*language area. Findings will demonstrate new understanding about different speaking proficiency levels, rationales about predictive factors, and cut-offs to be considered as standards that will be adopted for the specific portuguese diagnostic test that is in validation process. Some of these new insights could be extended to the general investigation of proficiency and cognitive decoding skills in second language research, mainly for European languages context.*

## 1. Introduction

Education in school's diversity demands substantial range of pedagogic and evaluation activities that still have a serious limitation in European countries: scientific validation. Educational policies and instruments remain to be researched [1]. Since 80s educational support for immigrant population was thought as emergent matter for school's practitioners. Nowadays landmarks and materials were provided mainly in American schools that reflect great concern over their own school populations and the diversity effect. In Europe checking practices from the experiences of other different countries is crucial to understand the results of instruments application and the benefits of research for creative reasoning in order to attain second language (SL) teaching. The main goal is to increase opportunities to promote SL learning and bilingualism. Relevant research is obligatory to be consulted to develop policies in Education of SL [2]. After a profound meta-analysis those authors emphasized which conditions are optimal for SL learning which is tied on teacher's profiles, immersion programs, home literacy practice, amount of first language instruction, and perception of teachers on cultural and linguistic diversity. Teacher's representations of mother tongues of students and their cultural backgrounds are significant and predictive variable to generate successful environment of teaching-learning. Accurate evaluation tasks in psychometric sound measures are additional variables to successful SL

teaching support. To understand learner's difficulty and to have knowledge of their SL proficiency is compulsory to assess skills in several linguistic and cognitive levels. These assessment efforts should be adopted as systematic practice inside schools to explain behaviors differentiation among diverse populations. Other aspect is expectation: specific languages suppose specific cognitive brain and predisposition to learn new language and new cultural meanings. Based in our current study we concluded [3] that indo-aryan speakers showed to have more limited proficiency and difficulty during evaluation tasks in portuguese SL. Second Languages determine aspects of acquisition and speed as well cognitive strategies considering that native language established a cognitive mapping. Alphasyllabary and alphabetic speakers make use of orthographic and phonological cues whereas morphosyllabary individuals make use of morphemes information to decode in every language in early first stages of exposure [4]. Switching between languages with very different phonological and writing systems could produce interference effect generating errors during language processing and decoding. These type of speakers should be evaluated to create knowledge that describe cognitive potentials and deficits and to be prepared to face psycholinguistic challenges in SL learning settings.

Instruments applied to native language instruction and assessment should not be transferred to second language learning as regularly observed in less structured educational systems. This is one of the misconceptions in SL teaching. Second language instruction demands specific resources to activate learning environment. Electronic resources and digital databases with comprehensive activities and devices would help specialized education in SL [5]. Our research project has the main goal to create an electronic repository of assessment and of educational tools to portuguese second language area based on validated instruments and recent knowledge from international evidence regarding teaching methods in SL worldwide. The most useful principle of our repository would be the differentiation of activities and materials according to diversity of SL learners because some resources (e.g., thinking aloud activities) would be successful to Slavic students but with no academic impact for Mandarin speakers. Segmenting and blending tasks as also reading and writing activities should be carefully designed to specific students attending to their home language and education in the country of origin. Diverse range of SL learners demands diversity of materials. In our previous empirical research study [6] the blending tasks showed to be the more difficult activity against the simplicity argued in these activities [7] especially for Slavic speakers who spend much more time and effort during phonemic blending in Portuguese

language. Measurement of skills gives indicators of student's profiles and their different limitations of proficiency which leads to appropriate intervention and educational tools [4]. SL testing in classroom should be placed in other terms to avoid large space inside curriculum time [8]. We believe that assessment should be carefully administered and longitudinally during first year of exposure to second language. Typical tests should be reviewed in order to avoid fixed rules and tasks that do not assess independent outputs of SL learners (e.g., changes of active to passive voice). It is mandatory to evolve testing purposes to measure how individuals develop their reasoning over the questions and trials. Assessment practices of research community in U.S.A. are not able to give the real picture of cognitive and linguistic behaviors of bilinguals [9]. More investigation is needed to produce and underpin changes in testing to be introduced in teacher's training. These issues are neglected in Portuguese schools considering the peripheral treatment provided to language teaching in education system. Scientific evidence present valid instruments with activities that could be accommodated in several classroom contexts: memory for sentences and texts (reading and recall of utterances and meanings), picture vocabulary, oral vocabulary (example of identification of synonyms and antonyms), listening comprehension (example of cloze tests), verbal analogies [10]. Previous studies present important advances in research of testing in second language considering mainly English context. Romance languages learning have been mistreated by research community in SL scientific area. New insights from verbal behavior and cognitive strategies in romance languages acquisition will empower advances in schools and new teaching knowledge toward methodology and assessment procedures that embrace the student's diversity and communities in each country. In this study we focused specific three measures at sub-lexical domain in Portuguese SL context: verbal analogy, cognates test, and metaphor comprehension.

## 2. Reasoning tasks and concepts retrieval

Verbal analogy test is widely used to analyze reasoning abilities. In SL field intend to measure the capacity of comprehension on logical word associations considering the cognitive strategies transference across languages. Romance languages speakers are expected to have better performance during verbal analogy task in Portuguese whereas Chinese speakers would be struggling in such test procedure according to languages family of each home language involved. This type of hypothesis will be further discussed at this study. Vocabulary could be simple or of high complexity to have a complete assessment at different levels of

proficiency. Higher size of vocabulary will help to understand and respond appropriately to the verbal analogy test. According to Woodcock-Munoz Language Survey Revised [11] verbal analogy test is placed among tasks complexity group and it is important to assess two of the seven cognitive factors involved in language strategies: comprehension-knowledge and fluid reasoning [12]. Verbal analogies are also covering assessment of broad ability and linguistic competence in dominant language. In our study verbal analogy test identify normative cases of limited proficiency but with particular features that will lead to profiles identification among several migratory students. Verbal analogy tests are less replicated in experimental trials in SL area [13] than other type of tests although being crucial to analyze reasoning abilities in language instruction, mainly considering which strategies are involved in decoding of alphasyllabary, morphosyllabary and alphabetic speaking languages. Further analysis of verbal behavior in reasoning tasks should be developed to examine cognitive association ability at semantic and conceptual level in new linguistic structures (second language).

In other plan, cognates test is important to determine how word recognition is affected and how much effort is spent [14]. Inhibition and control effects are related to cognates decoding and produce knowledge about strategies that individuals use to decode word with morphemic similarities to word of native lexical system. The implications of cognates comprehension in general literacy skills and recognition abilities has little empirical examination mainly applying to children [15]. Cognate's identification would be a challenge for SL beginners due to meaning ambiguity and cognitive bias which affects the speed in comprehension. Co-activation in home and second languages is other phenomenon that cognates test would help to understand and describe in scientific manner arising knowledge about time-consuming and linguistic cues involved in SL comprehension. Findings revealed that cognates comprehension informs about bilingual abilities and facility toward written receptive vocabulary [16] while limited proficient learners have to face multiple options to select accurate response in cognates and non-cognates context. Cognate's identification requires strategies of noticing, retrieving and of generating lied on prior lexical knowledge (from first language storage information). Additionally marked languages such Portuguese and other similar romance languages from indo-european [17] are important factors to comprehend levels of complexity across languages and possibility of cognates occurrence. Dominant cues in specific languages should be apprehended to have control over meanings (and forms) to recognize words true similarities.

Finally the current study addresses implication regarding comprehension of Portuguese SL learners in metaphor context. Idiomatic utterances in specific languages could be unfamiliar for immigrant students and constitute higher level of difficulty for second language conceptual acquisition. Conceptual awareness could be measured trough metaphor interpretation [18]. Decode into figurative second language notice specific and great amount of cognitive execution due to the fact that metaphor comprehension is a difficult area even for native subjects [19]. Individuals, especially children, attain to the idiomatic sentences message in very insufficient way considering that they operate in the basis of literal decoding and do not complete the figurative meaning. Faust [20] analyzes the impact of metaphor decoding in general language rules comprehension and the involvement of right-hemisphere and other brain areas during metaphor decoding. Right hemisphere is more involved in semantic violations acceptance than left hemisphere [20]. Figurative language undermines semantic irregularities and unconventional lexicon that could be stressful for SL learner in early stage of learning. In cognitive understanding late inferential processes are expected to achieve meaning of idiomatic sentences. Connotative meaning is related to problem solving of higher abstractness and might have different levels of difficulty considering novel or conventional idioms. Mastery of idiomatic utterances of language reflects higher proficiency and control over semantics in all language contexts by having sufficient knowledge about formulaic sequences inside idioms to comprehend multiword expressions. The salience of literal meanings [21] is prominent during initial stages of limited proficiency in SL and the most common errors appears in idiomatic interpretation [22], at more advanced lexical areas. For example, in English language the idiomatic expression "go home" is integrated in basic idiomatics list, but complexity evolves to other non-literal expressions that became more difficult for students. In Portuguese language idiomatic expressions are much related to popular knowledge and traditional lexical corpora (proverbs) which demands specific concepts and linguistic domain, especially in semantics. Small vocabulary and general limited semantic comprehension in main language would predict lower performance in idiomatic utterances identification task.

### 3. Method

#### 3.1. Participants

The participants consisted of 106 Portuguese second language learners (mean age = 13 years old), 57 males and 46 females (from basic and high school

levels). Almost students were born outside Portugal (only 10 were born in Portugal but have emigrated before schooling) and first school instruction was mainly in their native countries. There are no disabled individuals and all participants are right-handed (laterality was also identified). The sample was collected from Lisbon district schools. This sample is intentionally heterogeneous regarding nationality and home languages. 23 nationalities were observed and 28 different languages. 32% are mandarin speakers, the most representative home language in this group of study. Using the categorization by language families: 33 speakers of mandarin, 32 speakers of romance languages, 14 speakers of slavic languages, 11 speakers of creoles, 10 speakers of indo-aryan languages, 2 speakers of afro-asiatic languages; 14 students arrived in the interval 2001-2005, 21 in the interval 2006- 2009, 55 in the interval 2010 - 2014. 61% arrived in the more recent interval.

### 3.2. Tasks and Procedure

The collection of data is scheduled during 2014, in Portuguese schools, and began in May 2013. This assessment study was constructed on the following selected levels: verbal analogy, phonetics perception, foreign accent, story recall, cognates, lexical retrieval, writing composition, morphological manipulation, phonemic blending and word transference. Preliminary data will be reported considering only three tasks partially adapted from indicators (not integral tests) of previous literature in SL testing. Scoring format is based on the original classification criteria of the tests. After the total score for each participant, groups are compared according to specific independent variables (such age and home language). In this first study of SL testing procedures adaptation we observed psychometric properties of the tests and idiomatic utterances task present limited internal consistency (.56) which would be argued based on expected limited proficiency in such cognitive demanding task. The other tests showed to be internal consistent.

*Verbal Analogy Test:* 6 items (based on Verbal Analogies Test n.º 2 of “Woodcock-Munoz Language Survey-Revised - WMLS-R [11]) with internal correlation consistency (cronbach’s alpha) of .60. Score: 1 point for each correct answer (total score: 6 points). Example of sample items: “Estrela está para céu assim como peixe está para \_\_\_\_\_” (fill in the missing word by logic association: ‘Star is for sky as fish is for \_\_\_\_.’).

*Cognates Test:* 5 items (based on the structure adapted from Cognate Awareness Test of Kenyon, Malabonga, Louguit et al. [23] with cronbach’s alpha of .69. Score: 1 point for each correct

correspondence (total score: 5 points). Example of sample items: “magoar/ options: ceder, tratar, ferir, acalmar” (connect the word “hurt” to the right word in meaning: ‘give up’, ‘treat’, ‘injure’, ‘soothe’). For the words list that appears in this test we analyze frequency levels based on CORLEX (national index of words frequency) and considering high level of lexical frequency in second language (portuguese). Intentionally, we propose words with similarities in form to generate distractors in lexical selection during task solving. Several errors are due to spelling similarity (error of transference). The students are asked to provide the word more closer in meaning. Portuguese words are not selected considering cognates across specific languages because participants are speakers from different home languages. Some of the words would be expected to have cognate relationship with lexicon of other foreign language among the languages diversity of participants, but most of the presented words has low frequency in the students’ mother tongues.

*Identification of idiomatic utterances:* 4 items with cronbach’s alpha .56. Score: 1 point for each completed response (total score: 4 points). Example of sample items: “Grão a grão enche a galinha o papo” (explain the following idiomatic expression: ‘Grain to grain the chicken fills the stomach’). The students should write in literal language the meaning of each metaphor.

Students were asked to complete full tests battery during approximately 60 minutes, in classroom evaluation context (in group session but students were tested individually). All tests were administered on paper and on a computer screen one at a time, to listen and register the sounds and texts. In the specific tasks reported at this study no computer was needed, only paper. Examinees received no feedback after the experimental trial. After the research study concluded, school practitioners and researchers will be introduced to the guidelines of the total rating and respective written rationales to handle a number of scoring challenges (incomplete answers to a task, different correct options for questions scenarios...). At a final stage of the study such guidelines and scoring will be established and informed to scientific community and schools. Treatment of data was accomplished by using the SPSS program (version 21).

## 4. Results and Discussion

### *Index of difficulty*

Levels of difficulty were estimated for each test according to the percentile analysis. Results showed (see table n.º 1) two distinct indicators for percentiles 25 and 75 determining elementary (P25) and proficient (P75) levels. In verbal analogy task 4

correct answers were identified as minimum in P25 whereas 75% students achieved over 5 analogies. In cognates awareness task SL learners were positioned below 2 words identified, in P75 was observed a performance of 5 correct identifications. In idiomatic utterances task 25% of SL learners presented absence of interpretation for all sentences. Over 75% only completed at least 1 positive interpretation.

Table n.º 1: Percentile analysis for total sample

	Verbal Analogy	Cognates Awareness	Idiomatic Utterances
P25	4,0	2,0	,0
P75	5,0	5,0	1,0

#### *Hypothesis 1: Age effects*

Percentile analysis was carried out to examine the performance differences according to age effects in the three tasks. Results described great difference between youngest children (7-9 years old) who showed lower performance than their peers in cognates test being the difference outlined when compared to high performance of young adolescents (7-9 years old: P25= ,75; 13-15 years old: P25=3 words). Young adolescents responded over the cutoff suggested in P25 estimated for general samples (see table n.º 1) whereas youngest children showed very limited behavior with values strongly below the P25 calculated for general sample. In verbal analogy test, youngest children showed to have the same limitation of proficiency (P25=2,5 analogies). Older participants perform significantly better in analogies comprehension. In identification of idiomatic utterances we observed that all age groups in percentile 25 do not completed appropriately the task. Metaphor comprehension showed to be highly demanding task for all students depending on age variable. Previous studies [24] concluded that children understand verbal analogies in the similarity basis and before 12 years old they are not able to perform verbal analogies mainly “high-order” relations. Comprehension of complex analogies in this type of tasks indicates a change in competence. Considering that second language learners have an additional variable that difficult the Portuguese decoding – limited proficiency in Portuguese language – children are expected to know the relations on which analogies are formed (prior knowledge storage) but there are failures in the tasks achievement because they do not attain sufficient vocabulary and semantic knowledge. This fact is not related to competence deficits [24] but with proficiency which predicts the importance to assess in SL longitudinally to understand problems

associated to proficiency or to competence. However, chi-squared tests and ANOVA’s were calculated and no age effects were identified for each task. Difficulty is generally perceived for the analogical thinking in SL context. Detailed results are displayed in table n.º 2.

Table n.º 2: Percentile analysis for age groups

Age	Verbal Analogy	Cognates Awareness	Idiomatic Utterances
7-9			
P25	2,75	,75	,0
P75	5,0	4,0	,0
10-12			
P25	3,0	2,0	,0
P75	5,0	5,0	1,0
13-15			
P25	4,0	3,0	,0
P75	5,0	5,0	1,0
16-18			
P25	4,0	1,0	,0
P75	5,0	5,0	1,25

#### *Hypothesis 2: Home language effects*

In verbal analogy task, mandarin, creoles and afro-asiatic languages speakers showed to be more proficient in logic association during verbal reasoning task (P25=4 correct analogies) against indo-aryan speakers with more misfitting cases (only 1 analogy in P25). Even speakers of romance languages (such Spanish) showed deficits during analogies identification. Slavic speakers (from Eastern European) are similar to first mentioned groups (see table n.º 3, Appendix A). Speakers of indo-aryan and creoles languages had lower performance in match correspondence (cognates test). According to previous data [6] it was expected creoles languages speakers to reveal accurate answers in verbal analogy test but not in cognates. In one hand they generally present lack in language proficiency compared to other language groups due to their previous school education in African countries that are identified with several deficiencies in language teaching field; in the other hand we believe that creoles speakers have advantage to understand vocabulary and complete the analogy relations in Portuguese due to similarities that home

language and SL share: Portuguese lexical properties at linguistic basis of creoles languages, but also similar concepts. Contrary, but attending to the same similarity fact, the cognates would be more probable to appear but generating confusion during decision task if cognate words were not previously apprehended. Cognate factor does not necessarily facilitate the translation process as assumed by Kroll and Bogulski [25]. Creoles speakers from African countries are immigrant students with lower achievement at early stages in Portuguese schools mainly justified by less preparation and less resources that prior education in country of origin ensured. Indo-aryan speakers are expected to have less success at this task because their home languages are unrelated to vocabulary and general semantic features of romance languages. Further analysis should be addressed into the correlation between cognate effect and the cross-language competition in languages such Portuguese. Execution control benefits the cross-language transfer and if cognates are perceived as true *similes*, distinguished from false cognates [26]. As observed for age variable, home language revealed to have no effects in this task and less occurrence of cognates was detected considering the differences across languages spoken by students from this sample. The heterogeneity of the sample (language group variable) diminished the cognate probability in this words list disposed in Portuguese language and low similarities are expected to be observed. Romance language speakers might had some cognates recognition (and word similarities perception) during this task which explains the higher performance of that language group (P25= 2,25). Chi-squared tests and Anova's indicated no differences between language groups. Detailed data are displayed in table n.º 3.

Table n.º 3: Percentile analysis for home language groups

	Verbal Analogy	Cognates Awareness	Idiomatic Utterances
Mandarin speakers			
P25	4,0	2,0	,0
P75	5,0	4,0	,0
Romance language speakers			
P25	3,25	2,25	,0
P75	5,0	4,0	1,0
Slavic language speakers			
P25	3,75	2,0	,0
P75	5,0	4,0	1,0

Creoles speakers			
P25	4,0	1,0	,0
P75	5,0	5,0	1,0
Indo- Aryan language speakers			
P25	1,0	,0	,0
P75	5,0	4,5	,5
Afro- asiatic language speakers			
P25	4,0	2,0	,0
P75			

### *Hypothesis 3: Exposure to Second Language and arrival date*

Moderated and similar performances were observed for all arrival dates except for the late arrivals (2010-2014) who presented the high results for analogies identification (P25= 4 analogies) which was not expected. Exposure to SL is universally considered as main factor to explain errors and limitations of SL learners. Reasoning task such verbal analogies could be more related to cognitive than to linguistic processing which would explain how late arrivals completed well this task. Early arrivals (2001-2009) showed to have more constraints in verbal analogy comprehension which could predict serious block in their proficiency in Portuguese or indicate that advance in SL learning does not improve competence at this specific level. Vocabulary knowledge is related and lexical learning could be still delayed. Increased SL exposure is strongly attached on lexical activation [28] but our results do not support that assumption. Individuals arrived in 2006-2009 interval reported higher number of word in cognates test while late arrivals showed less completed match. For metaphor comprehension results showed similar extent of proficiency regardless date arrival to Portuguese schools and amount of exposure to SL. Chi-squared tests revealed statistical differences ( $p=.000$ ) for late arrivals (2010-2014) for figurative language decoding. Recent group (with less exposure to Portuguese SL) was the most successful responding to idiomatic utterances. These data indicate unexpected assumptions over the principle of exposure to SL which improves proficiency and comprehension. Figurative language, mainly idioms, involves reasoning thinking at more complex level

which is not fully grasped by children and by foreign learners. At this study late arrivals might be with more sensitivity to details of non-literal utterances which is connected to cognitive incoming and not with linguistic proficiency (as in the case of verbal analogies processing: late arrivals performed better than peers in verbal analogy task). Non-literal text does not demand syntax or semantic regularity, in contrary there is some 'violation' [20] allowed in grammar. Acquisition of metaphoric awareness enhances SL learners ability to develop vocabulary and receptive fluency [27] as well literacy skills in dominant language. Figurative language is cognitive demanding and instates speech production suggesting that late arrivals would be ready to explore the metaphorical origins of sentences in foreign language and do not depending on great amount of SL proficiency at this stage. Results are displayed in table n.º 4.

Table n.º 4: Percentile analysis for early and late arrivals

	Verbal Analogy	Cognates Awareness	Idiomatic Utterances
2001- 2005	2,0	2,5	,0
P25	5,25	5,0	2,0
P75			
2006- 2009	3,5	2,75	,0
P25	5,0	4,25	1,5
P75			
2010- 2013	4,0	1,5	,0
P25	5,0	4,0	1,0
P75			

In summary, results from this specific empirical study revealed that there are indeed different SL learners that should be considered separately in school in order to develop correct materials and teaching methods. Indo-aryan speakers are the students at risk in general SL learning which would be also tied on expected affective outputs during school instruction. Portuguese language offers kind of complexity and specificity that is typical in romance languages and their phonological systems, mainly for afro-asiatic and indo-aryan language speakers. Alphasyllabaries differently from

morphosyllabaries need more help in school instruction considering the scenario provided by these results. These students are speakers of languages with great linguistic distance from indo-european romance languages which difficult the cognitive processing involved in Portuguese language learning. But, morphosyllabary students (speakers of languages such Mandarin) represent the fact that even being aware of linguistic distance there are other factors involved like cognitive and cerebral mapping that facilitate or difficult acquisition of other new language with strong different basis. Dissimilar extent of the development on SL learning and academic general success would be expected for those students. Diversity of activities after the evaluation (diagnostic) at school should be completed attending differences observed. European schools with romance languages as language of instruction, even in bilingual tuition settings (Belgian schools, for example), would benefit of further investigation in SL area to more advanced scientific understanding and validated materials for SL learning of immigrant students that arise to European schools. Potential factors were analyzed in this study by observing the predictive probability of age, home languages and exposure variables in performance along three tasks of general reasoning and vocabulary retrieval. Validity of the tests presented in this study showed a limitation attending to low positive coefficients of internal consistency. New analysis will be applied after the conclusion of the empirical research. Regulation processes in SL learning depend on teaching (awareness of this diversity of cognitive predispositions and mappings) and learning (variability of proficiency and rhythms for new language learning). We concluded also that language proficiency would be minor factor in specific cognitive tasks such verbal analogies and idioms where individuals outperformed even with limited exposure to Portuguese SL. Conceptual comprehension could be early acquired than linguistic proficiency over all grammar rules. Conceptual comprehension (intrinsically related to metaphor comprehension) does not involve solely grammar control but other cognitive abilities. By studying the variables effects and the type of processing in SL we can provide robust theory for the educational practice and for new insights in scientific framework. These tests will be in future available in electronic repository of instruments in SL area, free and open for all scientific community and schools. This repository will be developed based in the principle of large connection to international repositories of assessment and digital resources in SL Education.

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